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THE JOURNAL

OF THE

American Medical Association

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VOLUME 109, No. 19

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535 North Dearborn Street, Chicago, Ill.

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THE JOURNAL of the American Medical Association is published weekly by the American Medical Association, 535 North Dearborn Street, Chicago, Ill. Subscription price, $7.00 a year. 25c a copy. Canadian $8.50. Foreign $11.00. Entered as second class matter June 25, 1885, at the Postoffice at Chicago, Ill., under Act of March 3, 1879.

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SEVENTH CRUISE-CONGRESS JANUARY 15 TO 31
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PAN AMERICAN MEDICAL ASSOCIATION—745 FIFTH AVENUE, NEW YORK

The Journal of the American Medical Association

Published Under the Auspices of the Board of Trustees

VOL. 109, No. 19 — COPYRIGHT, 1937, BY AMERICAN MEDICAL ASSOCIATION CHICAGO, ILLINOIS — NOVEMBER 6, 1937

ANTRAL GASTRITIS AND SPASM

CHAIRMAN'S ADDRESS

ROSS GOLDEN, M.D.

NEW YORK

During the past decade an increasing volume of information concerning inflammatory conditions in the stomach has been provided by histologic studies of freshly resected material and by increasing use of the Wolf-Schindler flexible gastroscope. Henning [1] stated that gastritis is the commonest disease of the stomach. Because it is the daily task of the radiologist to search for causes of digestive disturbances, it seems desirable to examine, from his standpoint, the evidence concerning this disease and to correlate the pathologic changes with those demonstrable by roentgen methods.

A review of the histology of gastritis as presented by experienced workers in the field (Faber,[2] Konjetzny,[3] Henning [1] and others) and of other phases, such as etiology, classification and treatment, cannot be attempted here. Only the aspects will be discussed which bear directly on the problem of x-ray examination of the stomach.

Gastritis is an inflammation of the gastric wall of as yet unknown etiology, which begins in and may be limited to the mucosa but which frequently extends to the deeper layers, even to the serosa. The disease may be generalized throughout the entire stomach but is often limited to or has its maximum effect in the antrum (Faber [2]). As far as motility is concerned, the antrum, or "canalis egestorius" (Forssell [4]), is the most important part of the stomach; therefore, inflammatory changes in that region may produce serious disturbances in gastric function. This has naturally led to the use by many writers of the term "antral gastritis" or some similar expression, such as "pyloritis" or "pyloric gastritis." Gastritis may produce any or all of the symptoms of peptic ulcer, including hemorrhage (case 1, fig. 1), which may be slight, severe or even fatal (Konjetzny,[3] Benedict [5]); pain, vomiting and loss of weight may suggest malignant disease.

From the Department of Radiology of the Presbyterian Hospital and of the College of Physicians and Surgeons of Columbia. University.

Read before the Section on Radiology at the Eighty-Eighth Annual Session of the American Medical Association, Atlantic City, N. J., June 9, 1937.

1. Henning, N.: Die Entzündung des Magens, Leipzig, Johann Ambrosius Barth, 1934; Ueber die Entzündung des Magens, Deutsche med. Wchnschr. **60:** 1455 (Sept. 28) 1934.
2. Faber, Knud: Chronic Gastritis: Its Relation to Achylia and Ulcer, Lancet **2:** 901 (Oct. 29) 1927.
3. Konjetzny, G. E.: Die Entzündung des Magens, in Hencke, Friedrich, and Lubarsch, Otto: Handbuch der speziellen Pathologischen Anatomie und Histologie, Berlin, Julius Springer, 1928, vol. 4, part 2, p. 768; Die Deckepithelveränderungen des Magenschleimhaut bei akuter Gastritis, Virchows Arch. f. path. Anat. **275:** 816, 1930; Zur Gastritisfrage, Wien. klin. Wchnschr. **46:** 451 (April 14) 1933; Das Krankheitsbild der Gastro-Duodenitis, Med. Klin. **32:** 473 (April 9) 1936.
4. Forssell, G.: Mechanism of Movement of Mucous Membrane of Digestive Tract, Am. J. Roentgenol. **10:** 87 (Feb.) 1923.
5. Benedict, E. B.: Chronic Gastritis, New England J. Med. **212:** 468 (March 14) 1935.

DIAGNOSIS

The diagnosis of gastritis depends mainly on the gastroscopic and the x-ray examination. The experienced gastroscopists (Schindler,[6] Henning,[1] Schloss, Ettinger and Pratt [7] and others) agree that in many instances no change takes place in the mucous membrane which can be demonstrated by x-ray methods and that in such cases the disease can be detected only by gastroscopy. Henning warned particularly against the interpretation of wide, exaggerated mucosal folds as "hypertrophic" gastritis.

There is ample evidence, however, that in many cases gastritis produces changes in gastric form and function, demonstrable by the barium sulfate meal, which the radiologist must be prepared to recognize. A brief review of the normal movements of the lower end of the stomach is a necessary preliminary to a discussion of these changes.

THE MUCOUS MEMBRANE AND THE ANTRAL SYSTOLE

As the narrow peristaltic wave enters the antral region, its relaxing edge decreases and its contracting edge increases in speed, closing off a portion of the lower end of the stomach and under normal conditions resulting usually in the expulsion of gastric contents. Then the wall relaxes promptly, and the lumen returns to its normal width and contour. This is known as the antral systole. Observations on a dog's stomach made in this department [8] after the placing of opaque markers beneath the serosa suggest that the antral systole is associated with a contraction of the longitudinal muscle toward the pylorus. Schindler,[6] from gastroscopic observations, described shortening of the antrum with antral peristalsis.

The normal mucous membrane of the stomach is freely movable over the muscle. This is easily demonstrated by palpation of a fresh specimen, by the separation of mucosa from muscle wall when the stomach is opened at necropsy and by the projection of the mucous membrane over the edge of the muscle when the living stomach is cut at operation. Forssell [4] has shown that the formation of mucosal folds is the result of independent contraction of the muscularis mucosae. Obviously this independent movement is contingent on the mobility of the mucous membrane and an intact muscularis mucosae. In some cases the mucosal folds in the antrum run irregularly transverse

6. Schindler, Rudolf: Gastroscopic Observation Concerned with the Gross Anatomy of the Stomach: The Musculus Sphincter Antri; Observation of the Position of the Stomach; the Mucosal Folds, Am. J. Digest. Dis. & Nutrition **3:** 149 (May) 1936. Schindler, Rudolf; Ortmayer, Marie, and Renshaw, J. F.: Chronic Gastritis, J. A. M. A. **108:** 465 (Feb. 6) 1937.
7. Schloss, Jacob; Ettinger, Alice, and Pratt, J. H.: Diagnosis of Diseases of the Stomach by Gastroscopic and X-Ray Relief Studies, Am. J. M. Sc. **193:** 171 (Feb.) 1937.
8. Unpublished work, presented as a preliminary report before the Midwinter Conference of Eastern Radiological Societies, New York, Jan. 29-30, 1937.

to the long axis of the stomach, and when the antral systole takes place they appear to change direction (fig. 2) and run neatly parallel with the long axis. I have observed this phenomenon in the dog's stomach as well as in the human stomach. (It is more easily seen in the small intestine.) For this change to occur, a movement of the mucous membrane in a cephalad direction must take place, thereby stretching it tightly beneath the muscular contractions. Otherwise, as the antrum closes off, the crisscross folds will be exaggerated, pushed down in a caudal direction and jammed toward the pylorus.

The failure of this stretching mechanism may account for the herniation of prepyloric mucosal folds through the pylorus. On a number of occasions I have observed under the fluoroscope a small polypoid elevation on the mucous membrane slide in a cephalad direction as the antrum closed off under a contraction. The change in the direction of the antral folds does not occur when there are moderately deep contractions but only when a deep constriction takes place by which gastric contents are expelled. Schindler [6] observed through the gastroscope the formation of radial folds with antral peristalsis.

Whatever may be the mechanism, this movement of the mucous membrane seems to be part of the normal antral physiology. These clinical observations are to be checked by animal experiments.

GASTRITIS AND DISTURBANCES IN MOTILITY

Involvement of the deeper layers of the stomach by inflammation occurs frequently according to all the writers reporting histologic studies of gastritis. The movement of the mucous membrane may be hampered or prevented by infiltration or fibrosis of the muscularis

Fig. 1 (case 1).—Antral gastritis with hypertrophied mucosal folds and hemorrhage: A doctor, aged 49, had digestive symptoms for many years. A severe gastric hemorrhage reduced his hemoglobin content to 50 per cent. The x-ray examination disclosed an asymmetrical defect in the proximal end of the duodenal bulb suggesting a polyp, with a heavy fold running through the pylorus and exaggerated folds along the margins of the bulb. At operation no polyp was found. The prepyloric mucosal folds were greatly exaggerated and could be easily pushed through the pylorus. On the edge of one of them was an erosion the size of a pin head, the only demonstrable site from which hemorrhage might have occurred. No duodenal ulcer was present.

mucosae and of the submucosa with adhesion of mucosa to muscle wall. This is apparently the explanation for the failure of the antral folds to flatten under pressure of the hand or of the constricting antral systole and for their herniation through the pylorus instead of retraction cephalad as gastric contents are expelled. Dwight [9] noted the failure of the mucous membrane to prolapse over the cut edge of the stomach wall in two cases in which resection was done for hypertrophy of the pyloric muscle.

Edema of the mucosa is frequently noted by the gastroscopists and is often mentioned by the histologists. In one instance (case 2, fig. 3) edema fluid was observed at operation to run from the cut edge of the stomach; in the microscopic section from the specimen large tissue spaces distended with amorphous pink-staining material were present in the submucosa. The edema and the inflammatory reaction in the submucosa and in the muscularis propria apparently affect the nerve plexuses. Holsti [10] made the only serious attempt at a special study of the nerve elements in the gastric wall which is to be found in the literature. In specimens from patients with severe digestive symptoms but without peptic ulcer, he was able to demonstrate acute inflammatory changes around and within the ganglions, more marked in the myenteric than in Meissner's plexus. According to Alvarez [11] there is some evidence that the myenteric plexus is concerned with relaxation; damage to or removal of the plexuses causes a rise in tone sometimes so marked that rhythmic contraction becomes impossible. Thomas, Creder and Mogan [12] found evidence that an inhibitory reflex from the duodenum was routed through the vagus; presumably, therefore, damage to the vagus endings in the gastric wall by inflammation might interfere with the operation of this relaxing reflex.

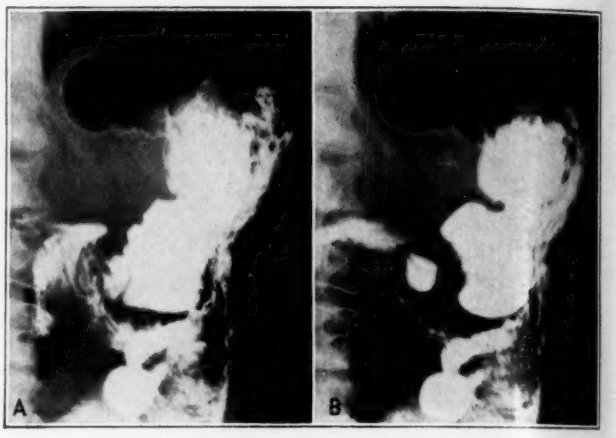

Fig. 2.—Change in direction of the mucosal folds with antral systole: *A*, with the antrum relaxed the folds run transversely across the stomach. *B*, With the antral systole the folds become much more slender and run parallel with the long axis of the stomach. Fluoroscopic observations suggest that the mucous membrane moves cephalad under the constriction.

Whatever may be the exact mechanism, in cases of well marked gastritis in which there can be no doubt about the diagnosis there are three major disturbances in motility: 1. Peristalsis may be very irregular in depth and in timing or may be absent for long periods: the waves seem stiff and fail to develop into antral systoles. 2. Prepyloric narrowing may be present, sometimes relatively slight and amounting merely to a

9. Dwight, Kirby: Benign Hypertrophy of the Stomach and Linitis Plastica, Ann. Surg. **85**: 683 (May) 1927.

10. Holsti, Östen: On the Condition of the Intramural Ganglions in the Stomach in Cases of Gastritis, Acta Med. Scandinav. **76**: 316, 1931: On the Nature of the Pylorus Affections Which Simulate Ulcus, ibid. **76**: 343, 1931.

11. Alvarez, W. C.: The Mechanics of the Digestive Tract, New York, Paul B. Hoeber, Inc., 1928, chap. 3, p. 15.

12. Thomas, J. E.; Creder, J. O., and Mogan, C. J.: A Study of Reflexes Involving the Pyloric Sphincter and the Antrum and Their Rôle in Gastric Evacuation, Am. J. Physiol. **108**: 683 (June) 1934.

failure of the region to expand flexibly to the normal width after a contraction, but sometimes so marked that the antrum appears as a narrow channel (case 3, figs. 4 and 5). In the narrowed prepyloric region the mucous membrane may be smooth and atrophic, increasing the similarity to annular infiltrating carcinoma, or the folds may be exaggerated and even polypoid in appearance. Barium sulfate may be prevented by spasm from approaching the pylorus for some time. 3. Pylorospasm may be present.

As a result of these disturbances the emptying of the stomach may be greatly delayed. A delay may occur in spite of a wide open pylorus. It is often difficult to expel barium sulfate by manual pressure at fluoroscopy.

The prepyloric narrowing is sometimes associated with mucosal erosions demonstrable only by the gastroscopist or by the pathologist and sometimes with real penetrating peptic ulcer, usually located in the upper part of the narrowed area or definitely above it. It has been the custom to attribute the antral spasm to the ulcer. As the narrowing may be just as marked

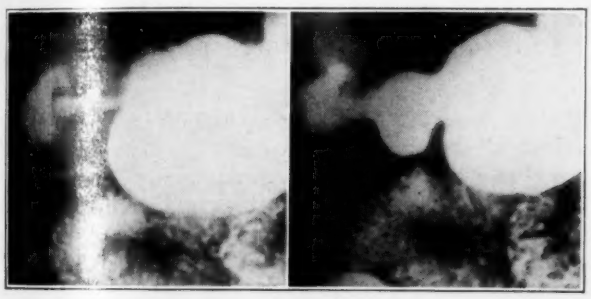

Fig. 3 (case 2).—Antral gastritis with prepyloric spasm: The lower end of the stomach was resected because the pylorus and prepyloric walls were thickened, making carcinoma difficult to rule out. Edema fluid was observed to run from the cut edge of the stomach, and the wall then became less thick and stiff. The pathologic examination disclosed hypertrophy of the pyloric muscle, a mucosal erosion not visible on the films and histologic evidence of gastritis, including marked edema of the submucosa. (Dr. E. P. Pendergrass, University Hospital, Philadelphia, gave permission to use this case.)

without as with an ulcer, it seems more logical to assume that the spasm is the result of the inflammation of the gastric wall, which is present in either case.

GASTRITIS AND HYPERTROPHY OF THE PYLORIC MUSCLE

Cruveilhier [13] is credited with the first description of hypertrophy of the pyloric muscle. Figure 6 is a reproduction of his beautiful illustration of this condition, which shows the narrowing of the prepyloric region. His description of two cases of benign pyloric obstruction indicates that he was probably dealing with the condition under discussion.

Boas [14] reported two cases in which his positive clinical diagnosis was confirmed at operation. He expressed the opinion that the hypertrophy of the pyloric muscle was the direct result of inflammation and used the term "stenosing gastritis." Serck-Hanssen [15] found gastritis invariably present with hypertrophy of the pyloric muscle and concluded that the demonstration of the latter may be taken as positive evidence of gastritis. In all of nine specimens of hypertrophied pyloric muscle in the Department of Surgical Pathology of the Presbyterian Hospital, histologic evidence of gastritis was observed (Stout [16]). After an analysis of the material from the Institute of Pathology of Berlin University, Rössle [17] concluded that this condition is secondary to inflammation in the pyloric region and is an "activity

Fig. 4 (case 3).—Antral gastritis, with marked spasm and hypertrophy of the pyloric muscle: A man, aged 63, with a long history of infections of the respiratory tract and shortness of breath complained of abdominal distention, gas, epigastric pressure and loss of weight for six weeks. *A*, examination elsewhere before admission to the Presbyterian Hospital disclosed persistent narrowing of the antrum, which was interpreted as annular carcinoma. *B*, reexamination after admission disclosed the same narrowing of the antrum. Because small mucosal folds persisted in the narrowed region, and because, on prolonged observation, an occasional moderate expansion was seen, the narrowing was interpreted as due to spasm and not to carcinoma. The arrow points to a shallow ulcer crater not to be seen on the films taken at the previous examination. The patient died of pulmonary insufficiency due to severe bullous emphysema. At autopsy benign hypertrophy of the pyloric muscle was observed (fig. 5). A small shallow mucosal ulcer which did not extend into the submucosa was demonstrated on the lesser curvature.

hypertrophy." He discarded the theory of congenital origin so frequently repeated in the literature, because the condition is observed too frequently in adults (3 per cent in 5,000 necropsies in Berlin and Basel) and practically never in older children.

In a study of 100 specimens of resected stomachs, Ramond and Jacquelin [18] observed thickening of the

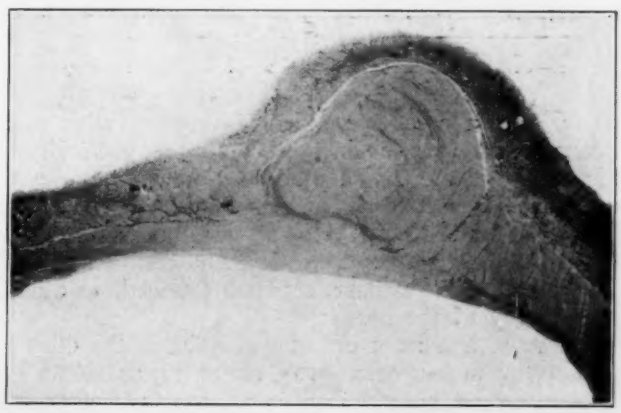

Fig. 5 (case 3).—Section of hypertrophied pyloric muscle under low power: Sections of the anterior wall of the stomach showed evidence of atrophy of the mucosa, with fibrosis and marked infiltration of the deeper layers with lymphocytes. The muscularis mucosae was fibrosed and in places almost destroyed. The superficial part showed postmortem autolysis.

muscularis almost always associated with what they called "pyloro-antritis." Konjetzny [3] (1936) stated that hypertrophy of the pyloric muscle results from "gastroduodenitis." According to the reports of many

13. Cruveilhier, Jean: Rétrécissement du pylore: Anatomie pathologique du corps humain, Paris, J. B. Baillière, 1835, vol. 12, p. 1, fig. vi.

14. Boas, J.: Ueber hypertrophische Pylorusstenose (stenosierende Gastritis) und deren Behandlung, Arch. f. Verdauungskr. **4**: 47, 1898.

15. Serck-Hanssen, Fin: Ueber das röntgenologische Bild der Pylorushypertrophie und präpylorer Spasmen bei chronischer Gastritis und Ulcus ventriculi, Beitr. z. klin. Chir. **157**: 404, 1933.

16. Stout, A. P.: Personal communication to the author.

17. Rössle, R.: Die Pylorushypertrophie des Erwachsenen, Schweiz. med. Wchnschr. **65**: 174 (Feb. 23) 1935.

18. Ramond, Felix, and Jacquelin, Charles: Les duodéno-pyloro-antrites, Arch. d. mal. de l'app. digestif. **25**: 618 (June) 1935.

others (Dwight,[9] Fitzgerald,[19] Kaufmann,[20] Wanke,[21] McNamee[22] and Johnston[23]) this condition, usually with thickening of the prepyloric muscle, seems invariably associated with inflammation. At the present time, therefore, the evidence strongly favors the opinion that gastritis is an important factor in the cause of hypertrophy of the pyloric muscle. In this connection, however, a question might be raised as to the significance of unilateral hypertrophy of the pylorus, which is not infrequently encountered.

The most important x-ray sign of hypertrophy of the pyloric muscle is elongation of the pyloric channel with preservation of the mucosal folds. When prepyloric spasm is also present, as it frequently is, the proximal limits of the channel may not be identified (case 3, fig. 4), and the diagnosis may be only suspected.

DIFFERENTIAL DIAGNOSIS

The difficulty encountered by both radiologists and surgeons in differentiating antral gastritis and its complications from carcinoma is attested by numerous writers (Haudek,[24] Serck-Hanssen[15] and others).

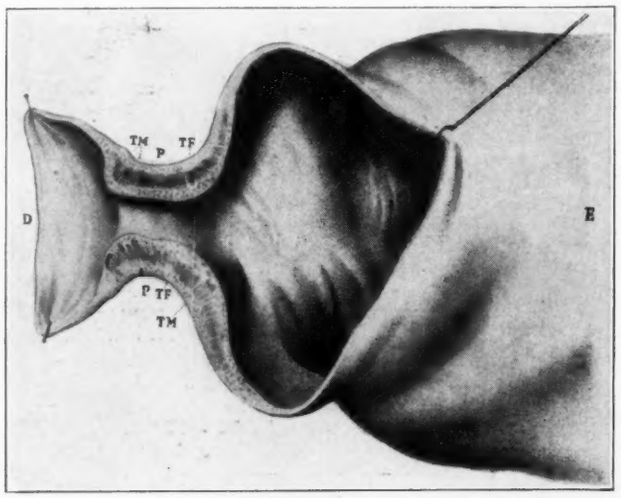

Fig. 6.—Cruveilhier's illustration of benign narrowing of the pylorus.

Many gastric resections have been correctly done because the surgeon could not be sure that the palpable thickening of the antral wall was not due to early malignant disease. The difficulty is enhanced for the radiologist by the fact that infiltrating carcinoma does not necessarily obliterate completely contractions of the muscle. Furthermore, carcinoma sometimes causes hypertrophy of the muscle.

The most important differential point is the demonstration by pressure methods (Berg[25]) or otherwise of mucosal folds in the narrowed area which should be obliterated by infiltrating carcinoma; sometimes these folds run through the pylorus into the duodenum. However, carcinoma may infiltrate one wall, leaving the mucosal folds intact on the other. If atrophic gastritis has caused a thinning of the mucous membrane and an absence of folds, the diagnosis becomes very difficult. Although the antrum or its prepyloric segment may remain persistently narrow, it may occasionally expand sufficiently to make it seem unlikely that an infiltrating lesion is present. A definite palpable mass corresponding under the fluoroscope to the antrum should be considered as evidence in favor of malignant disease.

Some writers advise repetition of the examination after the administration of atropine to physiologic effect, but I have never been much impressed by its efficacy. The importance of gastric lavage in the treatment of gastritis is emphasized by many observers. Boas[14] recommended it in 1898. Repetition of the examination after several days of lavage, particularly if definite stasis is present, has been more helpful according to my experience.

Konjetzny[3] (1936) expressed the opinion that demonstration of enlargement of the pyloric muscle should be considered an indication for operation because of the difficulty, even with biopsy, of differentiating a benign from a malignant lesion.

SUMMARY

Antral gastritis is associated with a "prepyloric syndrome," as Kaufmann called it. This syndrome consists of (1) prepyloric narrowing of varying degrees due to spasm; (2) abnormal, stiff, irregular peristalsis; (3) sometimes exaggeration and sometimes diminution or absence of mucosal folds; (4) hypertrophy of the pyloric muscle; (5) shallow mucosal erosions which are not demonstrable by x-ray methods, or penetrating ulcer of the lesser curvature; (6) delay in emptying sometimes resulting in a twenty-four hour gastric residue. These signs may not all be present in any one case.

The available evidence suggests that the inflammatory reaction in the gastric wall is directly responsible for these physiologic disturbances and anatomic changes, with the possible exception of the penetrating ulcer. The mural nerve plexuses are apparently concerned in relaxing reflexes. It seems possible that the mechanism of the antral spasm is an effect of edema and inflammation on the ganglions.

The differential diagnosis from carcinoma may be difficult but depends largely on the persistence of mucosal folds in the involved region and, in doubtful cases, on repeated examination after treatment with relaxation of the prepyloric spasm. If doubt persists, operation is advisable.

622 West 168th Street.

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22. McNamee, E. P.: Pyloric Stenosis with Hypertrophy of the Pyloric Muscle in Adults, Am. J. Roentgenol. **29**: 24 (Jan.) 1933.
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25. Berg, H. H.: Röntgenuntersuchungen am Innenrelief des Verdauungskanals: Ein Beitrag zur klinischen Röntgendiagnostik insbesondere von Entzündung, Geschwür and Krebs, ed. 2, Leipzig, Georg Thieme, 1931.

Protection Demanded Against Noise.—There has gradually developed in Great Britain a public consciousness of the insidious growth of the social evil of needless noise—a pernicious by-product attributable in great part to an increasingly mechanized civilization. With this growing realization, the nation is beginning to demand and to receive protection against the nuisance of outrageous noise whether generated by private or public bodies. It is looking for ways and means of mitigating excessive transport noises, particularly on the road and in the air, and it is seeking to know why in modern houses or flats it should not be accorded adequate privacy against the natural, though sometimes unreasonable, noises of neighbors.—Kaye, G. W. C.: Noise and the Nation. *Nature*, Sept. 11, 1937, p. 446.

SIMPLIFIED TECHNIC OF ONLAY GRAFTS

FOR ALL UNUNITED FRACTURES IN ACCEPTABLE POSITION

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AND
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Autogenous bone grafts have come to be generally employed in the treatment of ununited fractures, with the exception of those of the neck of the femur and carpal navicular, where other methods are not infrequently used. In case of an ununited fracture of the shaft the grafted material may be made to serve as internal fixation apparatus, supplementary bone, osteogenic substance and stimulant to osteogenesis in those parts of the bone fragments which come in contact with it. Analysis of cases reveals that there is considerable variation in the necessity for any one of these functions according to the case at hand. Thus if the fragments are little atrophied and no bone has been lost there will be less necessity for supplementary bone than if atrophy is marked and if portions of cortex have been lost. Also if the cause of the nonunion is wide separation of fragments there will be less necessity for osteogenesis from the transplant than if there is nonunion with the fragments in good apposition because of failure of osteogensis. And by the same criterion if the fragments are in good apposition and alinement there will be less necessity for the graft as an internal fixation apparatus than as an osteogenic agent and possibly as supplementary bone.

Hence the technic of bone grafting for ununited fracture cannot well be standardized to one procedure and should be varied somewhat according to the anatomic and physiologic conditions that are present. It should always be made as simple as is compatible with the necessities of the case.

If there is displacement and overriding or if there is loss of substance, reduction may necessitate freeing the fragments completely of soft parts for a variable distance back from the fracture line, and resection of one or both ends may be necessary to obtain adequate contact. In such cases a graft should be used to fix the fragments in the corrected position. As a rule a relatively strong whole thickness onlay graft best serves the purpose. It may be anchored to the fragments by encircling ties of aluminum bronze or silver wire,[1] by heavy catgut or kangaroo tendon or by screws made of beef bone or autogenous grafts according to the technic so well worked out by Henderson,[2] Campbell[3] and others.[4] In addition, cancellous or osteoperiosteal grafts are placed along the fractured line or in defects of the cortex to assist in osteogenesis and in some cases to serve as supplementary bone.

On the whole, the results of this type of operation have been very satisfactory. It is, however, a relatively extensive procedure and consequently carries some risk of infection and, in case of large bones, especially the femur, of hemorrhage and shock. The lengthy denudation of fragment ends undoubtedly devitalizes some of the bone at times, but this seldom interferes with union. Dead sterile bone has been encountered a few times at operation for nonunion where at a previous operation the ends were extensively denuded, as in case 6 of this series. In one case of fractured femur 1½ inches of the end of the upper fragment was gray and bloodless five months after denudation, and microscopic examination of the resected portion showed it to have undergone aseptic necrosis. This was no doubt a factor in the causation of nonunion. Resection of fragment ends sometimes shortens the bone to an objectionable extent. The introduction of foreign substances such as beef bone, kangaroo tendon and wire for anchorage of the graft increases slightly the risk of infection. Also in

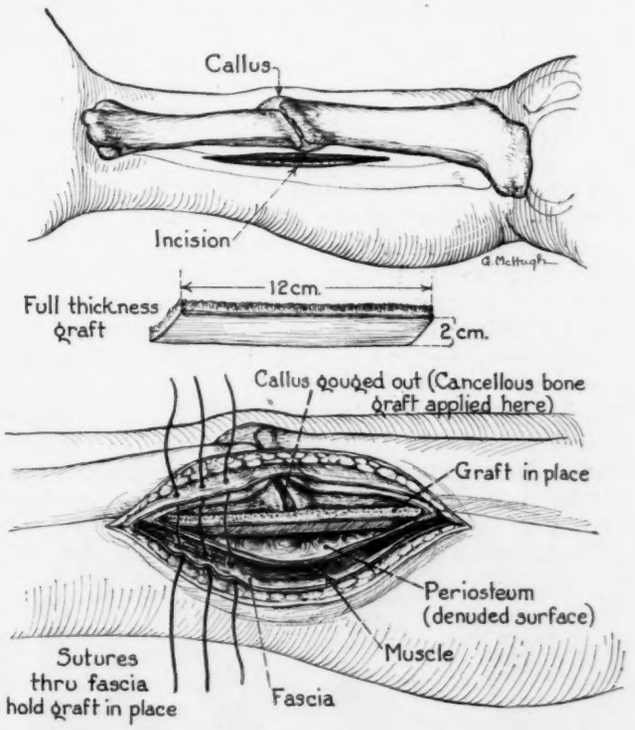

Fig. 1.—Technic for simplified onlay bone graft procedure. Above is shown an ununited fracture of the tibia as in case 1. Beneath this is an enlarged view of the bone graft and below its insertion.

the case of small bones and of extremely atrophic large bones in children the technical difficulty makes it inadvisable to attempt fixation with screws.

To lessen these risks a simpler operation has been used in cases of nonunion in which displacement is not marked and the position of fragments is such that if union were present the result would be acceptable. The bone of the fracture site is laid bare only on one side, leaving the attachments on the other side to help maintain position. Cancellous and whole thickness onlay grafts are applied and held in place by suturing the soft parts about them. The grafts set up osteogenesis and serve as supplementary bone but do not immediately fix the fragments to any appreciable extent. The use of the method in a small number of cases has previously been reported.[5] The success of the procedure

From the Department of Surgery, the University of Chicago.
Read before the Section on Orthopedic Surgery at the Eighty-Eighth Annual Session of the American Medical Association, Atlantic City, N. J., June 11, 1937.

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2. Henderson, M. S.: Massive Bone Graft Applied for Nonunion of the Humerus, Surg., Gynec. & Obst. **46**: 397-402 (March) 1928. The Massive Bone Graft in Ununited Fractures, J. A. M. A. **107**: 1104-1106 (Oct. 3) 1936.
3. Campbell, Willis: The Onlay Graft in the Treatment of Ununited Fractures of the Long Bones, South. M. J. **20**: 107-114 (Feb.) 1927.
4. West, W. K.: Massive Onlay Bone Grafts of the Upper Extremity, J. Oklahoma M. A. **29**: 39 (Feb.) 1936. Kirschner, M., and Schubert, A.: Operationslehre, Berlin, Julius Springer **1**: 496, 1927.
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is based largely on the fact that if a large onlay graft is applied across the fracture line in good contact union takes place between it and the fragment ends and then the intermediary callus ossifies, whether it is old or new.

The technic of the procedure is as follows:

1. The fracture is exposed through a 12 to 16 cm. incision and the periosteum incised and reflected from about one half of the circumference of either fragment for an average length of from 5 to 7 cm.

2. An even surface is created for the reception of grafts by chiseling away any protruding callus or displaced cortex.

3. The intermediary callus is usually gouged or curetted out of the fracture line in most of its extent. While union occurred in all of the fourteen cases when this callus was left in, still it is considered best to remove it when feasible, as a newly formed callus should ossify more readily than an old one. The fragments are angulated somewhat to assist in the process, care being taken not to detach the bridge of callus and soft parts on the opposite side, which might permit of displacement. The bony callus closing the ends of the marrow cavity is not removed, as this has been found unnecessary. Any preexisting angulation can usually then be corrected.

4. One or sometimes two appropriately dimensioned whole thickness and several cancellous bone grafts are applied to the prepared surface and along the fracture line as indicated in figure 1. The grafts are taken usually from the healthy tibia, but in some instances from the longer end of the fractured bone or rarely from other bones. Endosteal surface is nearly always placed next to cortex of fragments and may be trimmed to fit. In case the graft is turned over in order to obtain a more accurate fit, its periosteum is stripped off.

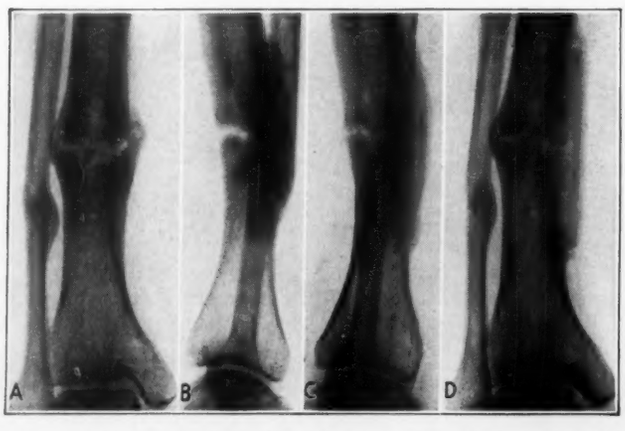

Fig. 2 (case 1).—Preoperative view and results at intervals after insertion of onlay graft in ununited fracture of tibia: *A*, before operation; *B*, six weeks after operation; *C* and *D*, five months after operation.

5. The grafts are held snugly in place in contact with the fragments by suturing the soft parts over them with interrupted sutures of 0 chromic catgut passing through the deep fascia. The subcutaneous tissues and skin are also closed with interrupted sutures.

6. A plaster-of-paris cast is applied and left on for from two to three months, depending on the case.

If there is infection with osteomyelitis as a result of compounding or of previous operation, it is first necessary to remove any dead bone and obtain wound healing. In most cases it is then advisable to wait for from three to six months, depending on the severity and duration of the old infection, before operation for the nonunion. But, in case of infected fractures of the tibia when the wound is anterior and of long standing and the posterior part of the fracture either has not been infected or has been free from infection for some time, a modified operation may be performed soon after closure of the anterior wound. It consists in exposure of the posterior surface of the tibia at the fracture level through a posteromesial incision as nearly opposite the old wound as possible and insertion of a heavy whole thickness bone graft about 10 cm. in length, leaving the intermediary callus intact except where an elevation must be leveled off for contacting the graft. If the recent field of infection is avoided, it is possible to insert a bone graft without infection and secure bony union weeks or months before it would be safe to open the whole fracture field, freshen the fragment ends and tie or screw on a whole thickness graft. But the incidence of infection among the cases to be reported was greater in this small group than in the large group that was either never infected or had been healed for months, so that care must be exercised in the selection of cases and in restricting the operative procedure.

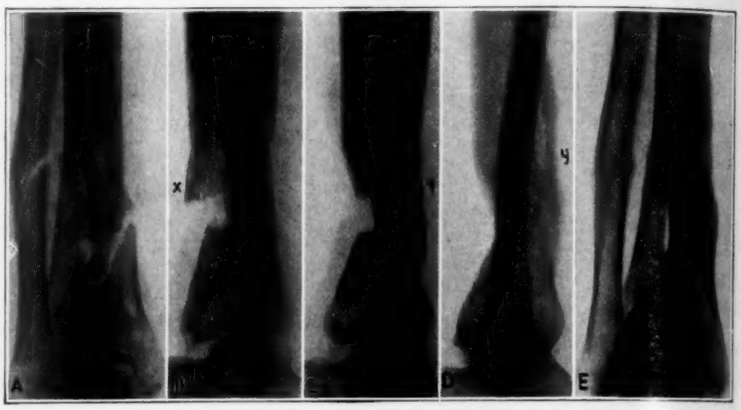

Fig. 3 (case 2).—Preoperative view and results at intervals after insertion of onlay graft in ununited fracture of tibia: *A* and *B*, before operation; *C*, twelve weeks after operation; *D* and *E*, twenty-two months after operation. *X* shows dead bone. *Y* shows transplanted bone.

ANALYSIS OF CASES

Among the ninety-three cases of ununited fracture of the shaft of bone operated on in the University of Chicago Clinics during the past eight years, this procedure was employed in thirty-nine, or 42 per cent. Twenty-six of the thirty-nine patients were males and thirteen were females. Thirty-six were adults and three were children, two of whom had congenital pseudarthrosis of the tibia. The age of the patients ranged from 2 to 62 years, the average being 35 years. Eleven cases were due to automobile accidents, a similar number to falls, three to gunshot wounds and the rest to other causes. Most patients received immediate treatment elsewhere. In twelve cases there is a record of the fracture being compound and in ten cases infection was noted. Previous operation for nonunion had been performed in three cases. Of the thirty-nine cases of operation for a total of forty-two fractures, bony union followed in thirty-eight. The one failure was the result of a technical error, and a second onlay operation resulted in bony union. In six recently healed cases of infection of fractures of the tibia operation was

done by early insertion of the graft on the side opposite the old wound, with mild recurrence of the infection in two but with union of the fracture in all instances.

The distribution of the fractures in the skeleton is shown in the accompanying table.

USE OF THE OPERATION FOR FRACTURES OF VARIOUS BONES

Tibia.—Ununited fracture of this bone was the one for which the operation was most frequently performed (fifteen times). It was also the fracture that before operation had been most frequently infected (eight times), that after operation in three cases became infected and that was the seat of the one nonunion. In one case of infection the whole thickness graft that became attached, although there was partial necrosis, was removed after the fracture united. In one instance both tibias were ununited and were united after grafting. In another case there was refracture three years later with nonunion, which again healed after grafting.

CASE 1.—L. P., a man, aged 25, illustrates the successful use of the method in a case in which a compound fracture of one year's standing had been treated early with a steel plate resulting in slight infection and nonunion. The plate was removed six months before and some dead bone five months before. The wound had been healed for four months. A whole thickness graft from the other tibia was applied posteromesially and an osteoperiosteal graft on either side of it at the fracture line, after some of the adjacent intermediary callus had been removed. There was primary healing of the wound. Figure 2 *A* and *B* shows the roentgenographic appearance before and six weeks after operation and *C* and *D* the healing five months after operation. Note the ossification of the old intermediary callus anteriorly in *C*, which was not disturbed at operation.

Case 2 illustrates the successful use of the method following infection and sequestrectomy when the graft

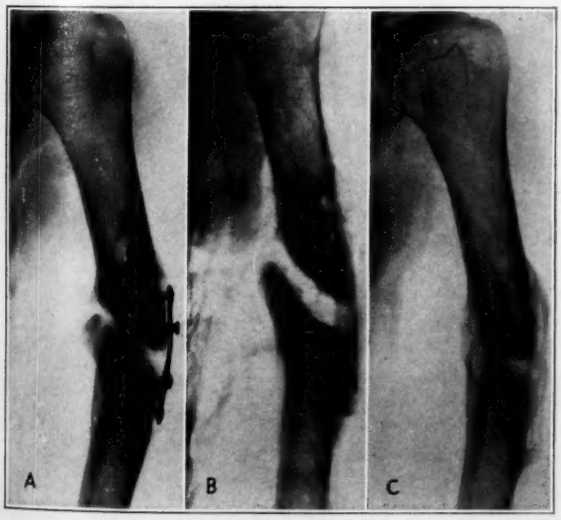

Fig. 4 (case 3).—Preoperative view and results at intervals after insertion of onlay graft in ununited fracture of humerus: *A*, before operation; *B*, one week after operation; *C*, ten months after operation.

was inserted posteriorly before the anterior sinus was healed:

CASE 2.—H. C., a man, aged 45, was admitted July 31, 1932, with an infected and ununited compound fracture of the lower third of the tibia of four months' standing (fig. 3 *A* and *B*). Two cm. of the anterior cortex of the upper fragment was dead and partly sequestrated and one month later it was removed through the anterior wound. Five weeks later, when the wound had become very small but was not yet healed, the posterior surface of the tibia was laid bare through a posteromesial incision and an onlay graft was applied and held in place by suturing the soft parts. Intermediary callus was not disturbed. Three months later the fracture was healed. A small sinus persisted anteriorly for some time but walking was resumed gradually and the patient returned to work. Figure 3 shows the result (*C*) twelve weeks and (*D* and *E*) twenty-two months after operation.

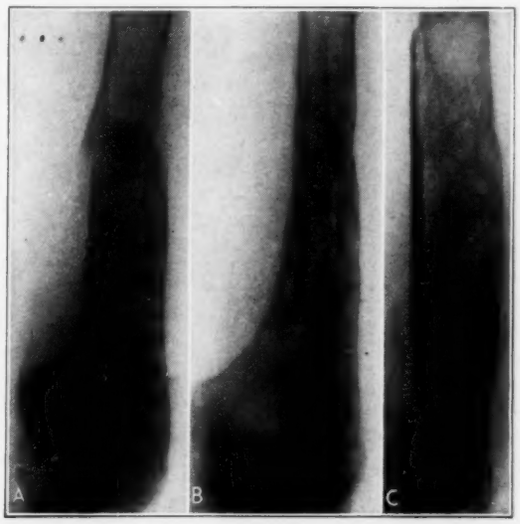

Fig. 5 (case 4).—*A*, preoperative view, and *B* and *C*, result six months after insertion of onlay graft in ununited fracture of humerus.

One fracture of the upper end of the tibia failed to unite as a result of the use of two short grafts that were applied without adequate leveling of surfaces, so that they were not in contact with the lower fragment.

Humerus.—The ends of the fragments are usually in contact, and angulation if present can usually be corrected after removal of intermediary callus, so that this procedure is relatively often applicable to the humerus. All eight cases remained clean, and union occurred promptly after one operation. In the lower half the incision should be along the course of the radial nerve and the graft should usually be inserted anterior and mesial to it. Near the elbow the graft should not be too thick, as it may interfere with motion. Cases 3 and 4 are illustrative:

Distribution of Thirty-Nine Cases of Ununited Fracture Treated by Simplified Onlay Graft

Bone Involved	Number of Cases	Union After First Operation	Union After Second Operation
1. Tibia	15	14	1
2. Humerus	8	8	..
3. Forearm	8	8	..
Radius	(2)	(2)	..
Ulna	(3)	(3)	..
Radius and ulna	(3)	(3)	..
4. Mandible	3	3	..
5. Shaft of femur	2	2	..
6. Clavicle	2	2	..
7. Ischium	1	1	..
Total	39	38	1

CASE 3.—B. C., a man, aged 35, fractured the left humerus fourteen months before admission. Nonunion persisted after a clean metal plating operation four months after the injury. The fracture site was exposed, the screws and plates were removed, the intermediary callus was gouged out and two tibial whole thickness and several cancellous grafts were inserted and the soft parts sutured. The body and arm were

in a cast for ten weeks, resulting in bony union. Figure 4 shows the condition (*A*) before, (*B*) one week and (*C*) ten months after operation.

CASE 4.—J. R., a man, aged 59, fractured the left humerus ten months before admission. Open reduction and metal plating one week after injury was followed by nonunion. The plate was removed after four months. The arm had been immobilized since and there was marked stiffness and bone

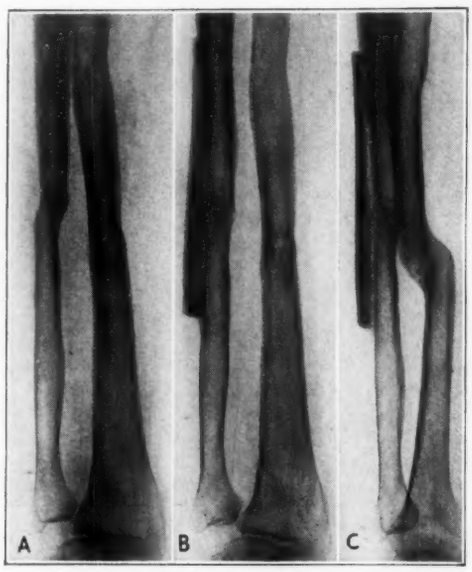

Fig. 6 (case 5).—*A*, preoperative view, and *B* and *C*, result twelve weeks after insertion of onlay graft in ununited fracture of ulna.

atrophy. Through an anterolateral incision the fracture was exposed, the callus gouged out anteriorly and a whole thickness tibial graft applied in front with cancellous grafts at the fracture line. Union occurred during ten weeks of immobilization in a body and arm cast. Figure 5 shows the condition (*A*) before and (*B* and *C*) six months after operation.

This was an ideal case for use of the procedure, since the apposition and alinement were excellent and there was no surface irregularity to be chiseled off.

Bones of the Forearm.—The method is well suited to nonunion of the shaft of the radius or ulna separately, as the fragments are often in good position but not so for nonunion of the two bones at the same level. In the latter group the fragments are likely to be displaced and angulated and the two bones approximated. Bony union followed operation promptly in the three cases in which both bones were ununited, but two cases were wrongly selected with bones too nearly approximated and an interosseous bony bridge formed which later had to be excised. Complete freeing of fragments with alinement and fixation by grafts tied or screwed to fragments is indicated in such cases, as in that way the bones are kept apart.

Case 5 shows the simplicity of the procedure when applied to the ulna:

CASE 5.—S. M., a man, aged 29, fractured both bones of the forearm ten months before admission. The ulna was cut down on a week later and the fracture ends were tied with catgut, but nonunion followed although the displaced radial fragments which were not exposed united. At operation ten months after injury the posterior surface of fragments was bared, intermediary callus was gouged out, cancellous and whole thickness onlay grafts were applied, and soft parts were closed over them. Bony union took place during eight weeks of immobilization in a cast. Figure 6 shows the lesion (*A*) ten months after injury and (*B* and *C*) twelve weeks after operation.

That the operation is suitable for more complicated situations is illustrated by the following case:

CASE 6.—C. Z., aged 37 years, fractured the ulna and dislocated the head of the radius two and a half years before admission. Three months after injury the radial head was removed and the ulnar fragments were fixed by means of an ivory peg. Nonunion persisted, and nine months later a tibial bone graft was applied and fixed with ivory screws. This failing, seven months later the fragments were anchored together with wires, but nonunion persisted. At operation the back of the ulna was exposed and the wires were removed. An area of dead bone was found at the end of the proximal fragment. Intermediary callus was curetted out, a heavy whole thickness tibial graft was applied, the wound was closed and the arm and forearm were immobilized in a cast. Bony union resulted after eleven weeks. Figure 7 shows the conditions present (*A*) on admission and (*B*) six months after operation.

Grafts for use in the radius and ulna should not be too bulky and should be cut from the upper end of the tibia where the cortex is thin.

Mandible.—The operation is better suited to the mandible than any other procedure, since anchorage of a graft with ties or screws is much more complicated. Through an incision along its lower border, the mesial surface of the mandible is bared and the graft applied. In two cases intermediary callus was removed and in one it was not disturbed. The graft from the thin upper cortex of the tibia is held snugly in place by the sutured soft parts. The upper and lower teeth are wired together for from six to eight weeks. Defects of the mandible have also been repaired by applying two whole thickness grafts in a similar way.

Fig. 7 (case 6).—*A*, preoperative view, and *B*, result six months after insertion of onlay graft in ununited fracture of ulna.

Femur.—Ununited fractures of the femur rarely lend themselves to this procedure, since displacement, overriding and angulation usually call for reduction and utilization of graft as an internal fixation apparatus. In the two suitable cases it worked out well, one being a transverse fracture, previously reported,[5] in which none of the intermediary callus was removed.

Clavicle. — The whole thickness graft should again be thin and the surfaces flattened to give good contact in order not to create a permanent bony enlargement.

Fractures of the ischium or other parts of the innominate bone very rarely fail to unite. The one case in this series was a part of the picture of multiple fractures of the pelvis four months previously and the fragments were widely separated. Three tibial grafts were onlaid and bony union resulted.

SUMMARY AND CONCLUSIONS

Ununited fracture with the fragments in acceptable position has been caused to unite in thirty-eight of thirty-nine patients at the first attempt, and in the one case of failure at the second attempt, by exposure of fragments on one side and the application of whole thickness and cancellous bone grafts, which were held in place by the overlying soft parts sutured about them. The intermediary callus may or may not be gouged out according to the case, but union occurred in all fourteen cases in which it was left in. The attached soft parts on the opposite side serve to retain the position of fragments, and displacement did not occur subsequently within the plaster cast. The operation is shorter and simpler than that in which fragment ends are freed, alined and fixed by a graft tied or screwed to them. The results demonstrate that it is unnecessary to remove the new bone closing the medullary cavity of the ends of the fragments. In selected cases of infected fractures of the tibia with nonunion, operation has been successfully done soon after healing by incising and implanting the graft in contact with the fragments through a clean field on the side opposite the scar, thereby saving much time. But infection did recur in two cases, so that they should be selected with care.

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ABSTRACT OF DISCUSSION

DR. WILLIS C. CAMPBELL, Memphis, Tenn.: The merits of any treatment must be estimated by the percentage of end results obtained. I have no doubt that by many operative procedures, as the employment of chip grafts, union can be secured in a certain proportion of cases, but the procedure that will secure union in the highest percentage is the one that warrants attention. I believe in the onlay graft and have been an exponent of that graft. There are two factors that are essential to obtaining union: first, absolute fixation; second, promotion of osteogenesis by the use of autogenous bone. This is best accomplished by a full thickness cortical graft pegged in place by autogenous nails, supplemented by spongy bone packed around the ends of the fragments. Firm fixation is thus secured, plus the introduction of autogenous material capable of osteogenesis. It is necessary to distinguish in all cases between delayed union and nonunion. In delayed union one can often secure good results by conservative measures, even by drilling holes in fragments, but in nonunion of long standing the problem is more difficult. When a Lane plate is applied, simple removal of the plate is frequently quite sufficient to induce union, as the plate itself may be causing the nonunion. I prefer to delay operative procedures for some time after removal of the plate to see what will happen before I employ any type of bone graft. This simple graft may be an excellent measure to use in this type of case. The question also arises as to the length of time in which union is to be secured. I find that after absolute fixation, which is secured at the time of the operation, union is obtained more rapidly and that apparatus can be dispensed with at a much earlier date than by less efficient methods. In fact, in one case of fracture of the bones of the forearm the patient left the hospital within twenty-four hours and took off his cast at the end of three or four weeks but he obtained an excellent union with a perfect result. That, of course, was unusual. However, I feel from my own experience in using all types of grafts that to produce osteogenesis alone is not sufficient; I did not have the same percentage of good results in a large number of cases that I am now able to secure by conforming to the two principles of absolute fixation and the promotion of osteogenesis by autogenous grafts and the use of spongy bone.

DR. W. K. WEST, Oklahoma City: While I have had no experience with the authors' method as described in this paper, it seems to me that it would be better to obtain stability as well as osteogenesis at the time the operative technic is carried out. However, it must be borne in mind that the pegging technic is not easy and is impossible unless adequate equipment and assistance is available. Therefore I can see that there would be circumstances in which the technic described would be the one of choice. For reasons of comparison, I wish to illustrate a few cases of nonunion in which the Campbell method of onlay graft was used when there was no callus formation or when there was marked defect in the bone continuity; also to illustrate a second method in cases in which there was an attempt at union but, for some reason, the fracture did not unite solidly. The Campbell technic consists in using autogenous bone pegs in connection with massive onlay grafts. The advantage of this method over any bone graft procedure in which osteogenesis is paramount is that one not only obtains fresh bone for healing of the fracture but at the same time maintains a very rigid stability. The second method is far simpler than the Campbell method or the method described by Drs. Harkins and Phemister. A simple sliding inlay graft is used, maintained by two small stainless steel wires which are easily removed with the use of a local anesthetic after union takes place. The sliding graft is especially indicated in cases in which apposition of the bone fragments is satisfactory or callus formation has begun. Good results can be expected by using this method, thereby avoiding the necessity of going into the tibia for the graft. From a medicolegal standpoint it is important to know that additional compensation is applied for in many industrial cases owing to the fact that there is a permanent scar on the leg resulting from removal of the bone graft.

DR. MELVIN S. HENDERSON, Rochester, Minn.: The technic of bone grafting is not standardized and properly never should be completely standardized. The particular method that is to be used must fit the case and not the case fit the method. No doubt certain types of ununited fracture can be quite conveniently treated by the method advanced by Drs. Harkins and Phemister. However, I think that if it were used in a routine manner in a large series of cases it would be found that there would be a fair proportion of failures. The authors have told us that it is not to be used in a routine manner. There are certain essential points about bone grafting that are definitely pertinent to this discussion. The technic displayed in the exhibit by my associates and myself in the orthopedic section is based on an experience over a long term of years in dealing with 591 patients with ununited fractures in whom over 600 bone grafting operations were performed. We have evolved a certain technic which we are using today and which is giving us better results than we have obtained in the past. The points we might call essential are (1) that the graft must be "massive," using the term massive to emphasize that the graft must be large. Willis Campbell has coined the word onlay. I think the two might be combined and that it might be called the massive onlay graft. Secondly, the very important factor in obtaining union in these obstinate cases is the use of small pieces of cancellous bone, packing them about the fracture line and the line of contact of the graft with the fragments. I learned this from Willis Campbell's bone block operation wherein he showed that a pile of small cancellous bone chips placed on the os calcis, just in front of the insertion of the achilles tendon, would lead to the formation of a column of bone that would furnish the block and prevent foot drop in paralytic flail feet. Thirdly, the fracture itself should be exposed, the eburnated bone ends removed and the medullary cavities in each fragment opened up. Fourthly, the graft should be held firmly to the fragments by some form of internal fixation, either autogenous pegs or beef-bone screws or in certain difficult cases by metal bands or metal screws. Fifthly, external fixation must be provided also. If one does not use external fixation in the way of properly applied plaster-of-paris casts one courts disaster. The reason for this is that there comes a weak period in the growing and healing period of a fracture and graft, usually at about the end of the sixth or seventh week. The graft is weakened by some absorption and

enough new bone has not as yet formed to give strength. If external fixation is inadequate at that time, the graft will in all probability break.

DR. ELVEN J. BERKHEISER, Chicago: In the June issue of *Surgery, Gynecology and Obstetrics* I reported several cases of nonunion of the clavicle in which I employed the same technic and obtained bony union not only in the cases in which the position of the fragments was acceptable but also in the cases in which the position was not acceptable in that the inner end of the outer fragment had to be freed and elevated because of its pressure on the brachial plexus; and in a third group in which there was loss of substance of the bone with a gap of more than 2 inches between the ends of the fragments. In fractures of the tibia with nonunion I prefer and have used a more simple technic than that demonstrated by Dr. Jepson at the Academy of Orthopedic Surgery. It has been used and bony union has been obtained in about twenty cases. This procedure has failed in a case of congenital pseudarthrosis in which operation was performed when the patient was too young. The simplified procedure consists of exposure of the tibia over the medial aspect, cutting the reversible graft longer in one fragment than the other with a single circular saw so inclined that the graft shall be wedged or in keystone shape in cross section. This graft consists of all layers—endosteum, medullary, cortex, cambrium and periosteal layers. I am prejudiced in favor of the use of the attached periosteum, although there is some difference of opinion about this point. Then the graft is reversed and driven in or countersunk. In doing this the receiving fragments are sprung outward and grasp the graft, holding it securely in position.

DR. EDWIN W. RYERSON, Chicago: The difference between this operation and most of the other operations for ununited fractures is that it does not attempt to fix firmly the graft, and it is perfectly evident, from the thirty-nine cases that were shown, that one does not have to secure absolute immobilization. Therefore the Harkins-Phemister method resolves itself into one of stimulation of osteogenesis. I don't say osteogene'sis, because in the Bible we say Genesis, Exodus, Leviticus and so on. There are certain fractures which need only some new bone as an osteogenic stimulus. There are other fractures which need more than that, and I think it is a pretty good principle when one is operating on an ununited fracture to secure just as much immobilization by the transplant as one can. On the other hand, to use the bone screws, whether beef bone or autogenous bone screws, is a much more difficult operation to perform and involves a little more risk to the patient from shock; so if one thinks one has a case in which simply some osteogenic bone needs to be applied, one should use this simple method. If there is no way of deciding, possibly, which way one ought to think, the fixation method should be used.

DR. DALLAS B. PHEMISTER, Chicago: The procedure was used in only 42 per cent of the cases of ununited fracture of the shaft, so that no attempt has been made to apply it to unsuitable cases. In the ordinary case of ununited fracture, the intermediary callus is unossified and the ends of the marrow canal of the fragments are closed by a layer of new bone. It is usually considered necessary to get rid of the intermediary callus and the bone closing the fragment ends before the application of the bone graft. Our experience with these thirty-nine cases has shown that, if a long, heavy, whole thickness graft is placed to bridge the fracture line and spongy grafts are applied at the fracture site, union of the fracture will follow whether or not the intermediary callus and bone closing the ends of the medullary canal are removed. It also shows that it is not necessary to fasten the heavy graft to the fragment ends if they are held together by soft parts on the side opposite the graft. The sutured soft parts hold it in place. Osteogenesis takes place from the ends of the fragments and from the graft where they come in contact as well as from the cancellous grafts, and bony union follows between graft and fragments. Accompanying this there is ossification of the intermediary callus. If this procedure is followed advisedly, nearly one half of the patients with ununited fracture of the shaft will be spared a more extensive operation.

EXOPHTHALMOS COMPLICATING IRRADIATION

LEROY A. SCHALL, M.D.
BOSTON

In the discussion of Dr. Frederick T. Hill's paper on "The Management of Malignant Disease in a Small Hospital," read before the Eastern Section of the American Laryngological, Rhinological and Otological Society last January, Dr. Perry G. Goldsmith reported a case of malignant nasal sinus disease in which exophthalmos developed after irradiation. In this discussion, Dr. Goldsmith emphasized our lack of knowledge concerning the pathology, the course and the prognosis of exophthalmos occurring as a result of irradiation.

The literature is indeed scanty. Although New[1] in 1926 reported the loss of eleven eyes in ninety-seven cases of malignant disease of the nasal sinuses, he did not specifically say that they were lost as the result of destructive changes secondary to irradiation. Ohngren[2]

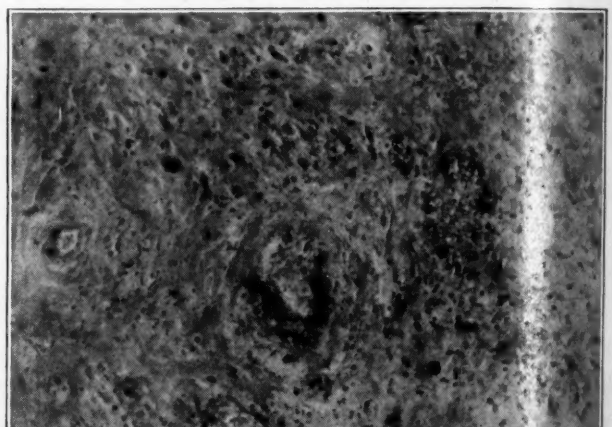

Fig. 1.—Three vessels are present in the midportion of this section. The artery centrally shows almost complete obliteration of its lumen with marked hyaline thickening of the fibrous tissue of its wall. There is slight lymphocytic infiltration. Note the degeneration of the elastica. On each side are venae comites, that to the left showing a change similar to the change in the artery, that to the right showing an irregular outline of its wall and its lumen only slightly narrowed, still containing red cells. Note the hyalinization of the collagen, the diffuse staining property giving a rather fuzzy appearance. Hyaline fibroblasts and lymphocytes are scattered through the tissue. Just beneath the artery is a moderate-sized telangiectatic vessel filled with red cells.

discussed injuries to the eye following his combined electrosurgical operation, both with and without irradiation, and he attempted to classify these injuries into two groups: first, those which were due to excessive heat generated at the time of the operation; and, second, changes in the eye that appear late, as the result of infection.

This paper is based on five cases in which exophthalmos developed as a result of the treatment of malignant disease of the nasal sinuses. In three of these cases the condition occurred after operation and irradiation. In two it followed irradiation without operation.

Read before the Section on Laryngology, Otology and Rhinology at the Eighty-Eighth Annual Session of the American Medical Association, Atlantic City, N. J., June 11, 1937.

1. New, Gordon B.: Malignant Tumors of the Antrum of Highmore, Arch. Otolaryng. **4**: 201 (Sept.) 1926.

2. Ohngren, L. Georg: Malignant Tumors of the Maxillo-Ethmoidal Region, Acta oto-laryng., supp. 19, 1933.

In the treatment of malignant tumors of the nasal sinuses I have followed the reasoning of Barnes,[3] and his words are worthy of repetition. He wrote:

It is obvious that the first principles of the operative treatment of malignant disease are violated when a tumor is removed, not only without a fair margin of normal tissue but also by a crushing operation which amounts to a curettage. No better method could possibly be imagined for producing local implantations and setting up distant metastases. Yet, on account of the bony surroundings of the tumors, which separate them from the brain and from the eye, no other course is open, except in case of antral involvement only. It is for this reason that immediate postoperative radiation is used.

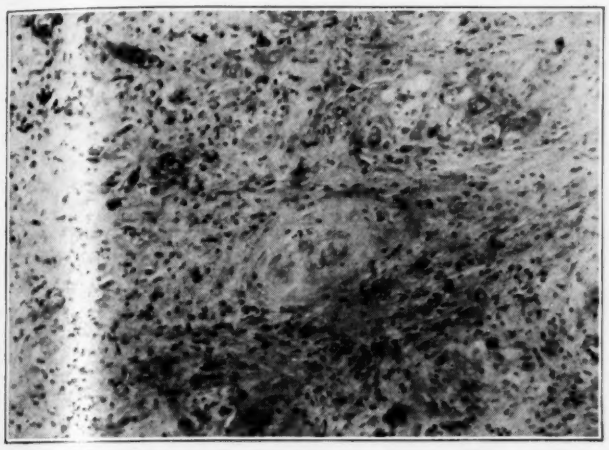

Fig. 2.—Radiation reaction in the orbit. In the center of the section is an arteriole completely obliterated by a hyaline thickening of the connective tissue elements of its wall. There is slight proliferation of the endothelium. Much of the connective tissue is hyalinized. Some of the fibroblasts are swollen and distorted. There is a rather diffuse lymphocytic infiltration.

IRRADIATION

Postoperative irradiation has consisted of platinum tubes of radon of a strength of approximately 100 mg. placed in the center of the gauze packing at the close of the operation. This packing gives an additional screening of at least 1.5 cm. of gauze. The radium is left in place for a total dose of from 2,000 to 4,000 mg. hours. This is the method advocated by Barnes. Recently I have increased the screening by the addition of 1 mm. of lead. In two patients exophthalmos developed even with this additional protection.

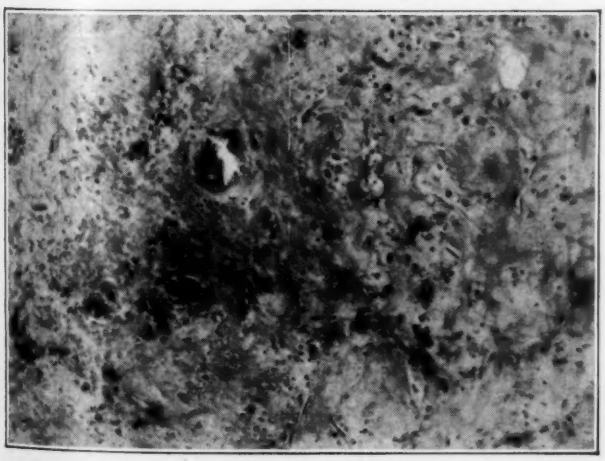

Fig. 3.—The right hand portion of the section shows marked hyalinization of the connective tissue, relatively acellular, and one or two small telangiectatic vessels. The left hand portion shows similar hyalinization of the collagen and a heavier lymphocytic infiltration, the cells being somewhat thickened. The vessels are dilated, containing red cells.

For patients with inoperable disease of the sinuses I have, at times, tried interstitial irradiation. By patients with inoperable disease I mean those whose physical condition will not stand operation and whose malignant growth has broken beyond the confines of the sinuses. The interstitial irradiation is given by means of radon in platinum needles of a wall thickness of 0.5 mm. and totaling about 100 mg. The needles are inserted into the tumor through a stab incision of the buccal mucosa of the canine fossae and are left in place for a total dose of from 2,000 to 3,000 mg. hours. In two patients exophthalmos developed after this method of treatment.

SYMPTOMS AND COURSE

Following irradiation, exophthalmos may occur early, even within the first twenty-four hours, or it may be delayed, coming on weeks after treatment. As the protrusion of the eyes develops there is conjunctival chemosis: at first, excessive lacrimation, then exposure and drying of the cornea. Orbital pain is constant and severe. The vision may remain good. With each case the problem of orbital extension of malignant disease must be weighed. As long as the cornea remains healthy, as long as there are normal vision and no limitation of ocular movements, conservative treatment should be employed. When degenerative changes have taken place, such as corneal ulceration and infection, loss of vision or limitation of ocular movements, orbital exenteration is necessary. It is necessary not only to relieve the pain but to eliminate the possibility of orbital extension of the malignant disease.

Fig. 4.—Transitional cell carcinoma involving the left ethmoid and antrum. A modified Mouré incision was made and exenteration of the tumor done with electrocoagulation. Radiation consisted of 4 platinum needles, totaling 75 mg. of radium. Protection consisted of 1 mm. of lead and 1 cm. of gauze. Exophthalmos developed within twelve hours, so that their irradiation was terminated at 2,000 mg. hours. Vision and the cornea remained good, and the exophthalmos gradually subsided in five months.

PATHOLOGY

The effects of irradiation on tissues have been studied by many pathologists, but the work of Wolbach[4] on the skin remains classic. I have been unable to find

3. Barnes, Harry A.: Malignant Tumors of the Nasal Sinuses, Arch. Otolaryng. **6**: 123 (Aug.) 1927.

4. Wolbach, S. B.: Pathological Histology of Chronic X-Ray Dermatitis and Early X-Ray Carcinoma, J. M. Research **21**: 415, 1909.

a previous study of the pathologic changes in exophthalmos following irradiation. I expected them to be the changes of edema and hypertrophy of connective tissue.

From study of the sections removed at four exenterations the pathologic changes due to irradiation on these structures may be described as those due to (1) the effect on the cells, (2) that on the intercellular substance and (3) that on the blood vessels.

In the resting cell the early effect of irradiation is swelling of the cell due to intercellular edema. Vacuoles then appear in the cell protoplasm. If the reaction is prolonged there is degeneration of the mitochondria and of the resting nucleus. If the cell is a secretory cell, degeneration of the Golgi apparatus may take place. In the actively dividing cell, irradiation may arrest mitosis during the early prophase stage. If the division has progressed beyond prophase the mitosis usually goes on to completion. The chromosomes may show varying degrees of degeneration.

Irradiation affects the intercellular substances by causing degeneration of the elastic fibers and by swelling or necrosis of the collagen. The late or delayed reaction may be hyalinization of the collagen or delayed necrosis of the collagen.

The effects on the vessels are both immediate and late. The endothelium of the vessel walls becomes

Fig. 5.—Lymphoblastoma of the antrum and ethmoid, which had broken through the front face of the antrum. Interstitial irradiation of 4,000 mg. hours was done. Three months later edema of the eyelids began, and in two weeks it had progressed to definite exophthalmos with limitation of ocular movements in all directions. There was no tumor involvement of the orbit.

degenerated and produces varying degrees of thrombosis. The late effects are fibrosis of the vessel wall with proliferation of the injured endothelium, which may lead to gradual occlusion of the vessel. Telangiectasis may occur in varying degrees and may be due to (1) degeneration of the cement substances, (2) degeneration of the Rouget cells or (3) occlusive changes in the deeper veins due to back pressure.

CONCLUSIONS

1. Exophthalmos may result from irradiation by accepted methods. It may come on within twenty-four hours, or its appearance may be delayed.

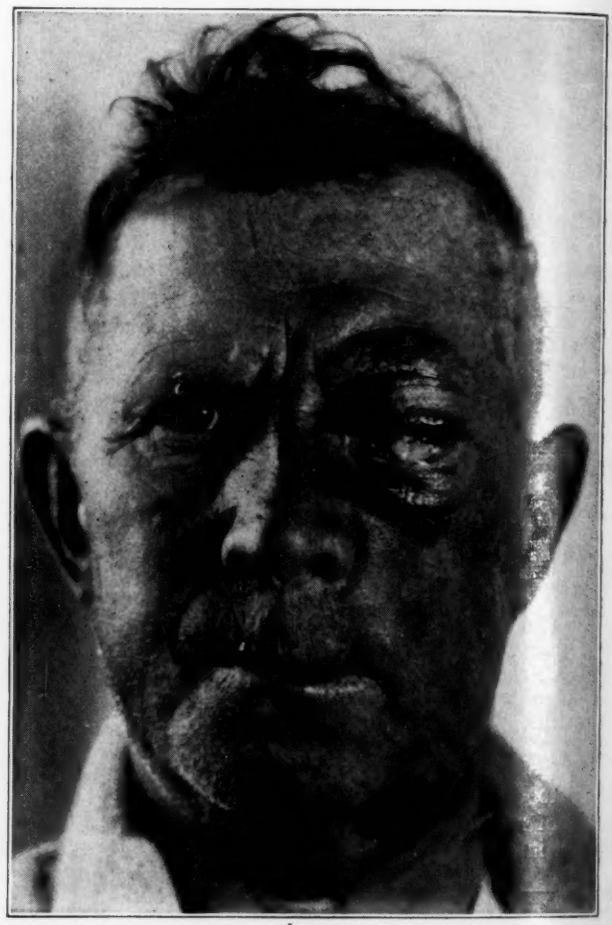

Fig. 6.—Epidermoid carcinoma, grade 3, of the left antrum and ethmoid breaking through the front face of the antrum. The patient is in poor physical condition. Interstitial irradiation, 2,000 mg. hours, was done. Exophthalmos developed four weeks after treatment, requiring orbital exenteration due to limitation of motion and pus in the anterior chamber.

2. Pain is constant and severe.

3. As long as degenerative changes in the eyes do not take place, conservative measures may be adopted.

4. Operative measures to protect the eye have been of little value.

5. With degenerative changes in the eyes, orbital exenteration is necessary not only to relieve the pain but to eliminate the possibility of orbital extension of the malignant disease.

6. The pathologic process is essentially that of degeneration and vessel thrombosis.

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ABSTRACT OF DISCUSSION

DR. ALGERNON B. REESE, New York: Dr. Schall states that some of his cases of exophthalmos appeared within twenty-four hours after irradiation, while others appeared within five to six weeks. Although I have not observed this immediate exophthalmos following irradiation, a possible explanation seems to be that the irradiation caused necrosis of the tumor, and the toxic effect of this produced an inflammatory reaction in the adjacent loose vascular tissue of the orbit. The cases of exophthalmos that Dr. Schall observed from five to six

weeks after irradiation must represent an extension of the new growth into the orbit or, possibly in rare instances, an infection, particularly in cases in which the antrum is the seat of the lesion. In the Head and Neck Clinic of the Memorial Hospital in the past five years I have observed eleven cases of exophthalmos complicating cancer of the nasal sinuses and thirteen cases complicating cancer of the nasopharynx. All of these patients had received radiation. In two cases which involved the antrum, the exophthalmos seemed to be secondary to an infection. In all the other cases it was thought that it was due to an extension of the new growth into the orbit. This was based on the fact that in some instances a mass was palpable in the orbit, in some there were signs of peripheral involvement of the nerves traversing the orbit, in some a papilledema, and in some an indentation of the scleral wall. I have observed no instances in which I felt that the radiation per se was a significant factor in the exophthalmos. If radiation in moderate doses, as given in Dr. Schall's cases, were a cause of exophthalmos, exophthalmos would frequently be seen in patients in whom fractionated doses of 6,000 and 7,000 roentgens are given to portals which include the orbit and which produce a blistering dermatitis of the eyelids and adnexa, and in some instances a necrosis of a portion of the cornea. It is significant that exophthalmos is not seen as a feature in such instances.

DR. JOSEPH C. BECK, Chicago: One must always differentiate in these cases between whether the complication is due to the action of the x-rays and radium on the tissues or whether other factors may have contributed, such as trauma following operation. Medicaments, such as caustics, may have been applied locally. Nevertheless, if one can show, in these otherwise fatal cases, that the x-rays and radium cured the condition, one can ignore the complication of exophthalmos. My contribution to the discussion of this paper lies in recording my observation in malignant disease about the head and neck treated by x-rays and radium alone or combined with surgical procedures, the cold knife, the endothermic knife, the actual cautery, and caustics such as zinc chloride being used. I have yet to observe one case of any degree of exophthalmos following irradiation with either x-rays or radium. On the other hand, I have seen exophthalmos develop when irradiation was done postoperatively. In these cases I have always been satisfied that the exophthalmos was due to the extensive and severe reaction from surgical intervention with its subsequent venous and lymphatic block. Having been present at many radical operations for malignant disease of the sinuses, especially by the thermic method (G. B. New, Rochester, Minn., and G. E. Ohngren, Stockholm, Sweden), as well as having used similar methods myself, I can visualize how the extensive heat could radiate far beyond the point of application and thus block the return circulation. Reference was made in the paper to a small tumor of the sinuses reported by Goldsmith. This was treated with radiation, and exophthalmos followed. It is necessary to know by exact measurements with an exophthalmometer the degree of exophthalmos before and after treatment. One should also know the technic employed. Permit me to suggest that experimental work be done on animals by means of excessive irradiation. It will be granted that the anatomy is comparative and that the pathologic changes will not be comparable to that of the cases here recorded. I am connected with a large public institution where several hundred cases of malignant growths are treated, including those of the sinuses. Much irradiation from x-rays and radium is used by all types of application. From the report of the chief of the tumor clinic, as well as from my own observation, exophthalmos has not been present very often as the result of irradiation.

DR. LEROY A. SCHALL, Boston: I do not have much more to say except to thank those who discussed the paper. In reply to Dr. Reese I would say that there was no tumor involvement of any of the orbits which required exenteration. Exenteration was done in four cases. One patient recovered without the necessity of exenteration. It may be that I chose a minute subject for presentation, but as a surgeon I am convinced that the condition causes considerable worry and that little help will be obtained from any one else when this type of case is handled.

RENAL LESIONS DUE TO DIETHYLENE GLYCOL

A PRELIMINARY REPORT

H. D. KESTEN, M.D.; M. G. MULINOS, M.D.
AND
LEO POMERANTZ, B.S.
NEW YORK

A report [1] of several fatalities following the use of an "elixir" of sulfanilamide made with diethylene glycol prompts this preliminary abstract of a portion of the work in progress on the pharmacology and pathology of the glycols and related chemicals. Only two studies of the toxicity of diethylene glycol appear in the literature. Von Oettingen and Jirouch [2] found, using four mice, that the minimum lethal dose was approximately 5 cc. per kilogram of body weight when given subcutaneously. Haag and Ambrose [3] reported that the ingestion of the glycol in concentrations of 3 per cent and 10 per cent in drinking water was rapidly fatal to rats and that the minimum fatal dose for rabbits is 2 cc. intravenously. The vital organs of these animals were found to be essentially normal.

Fig. 1.—Kidney of rat receiving 5 per cent diethylene glycol in drinking water for seventy-two hours. Vacuolization and swelling of epithelium of convoluted tubules. Distention of glomerular spaces. ×110.

EXPERIMENTAL WORK

Diethylene glycol was administered to 107 young adult white rats and to twenty-six rabbits in the following manner. All the animals studied were kept on a

The expenses of this research were partially defrayed by the Philip Morris Fund.

From the Departments of Pharmacology and Pathology, College of Physicians and Surgeons, Columbia University.

1. Various newspaper articles dated October 18 and 19. Deaths Following Elixir of Sulfanilamide-Massengill, editorial, J. A. M. A. **109:** 1367 (Oct. 23) 1937.

2. Von Oettingen, W. F., and Jirouch, E. A.: Pharmacology of Ethylene Glycol and Some of Its Derivatives, J. Pharmacol. & Exper. Therap. **42:** 355 (Aug.) 1931

3. Haag, H. B., and Ambrose, A. M.: Studies on the Physiological Effect of Diethylene Glycol, J. Pharmacol. & Exper. Therap. **59:** 93 (Jan.) 1937.

standard laboratory diet except that the only source of fluid for the rats was that containing diethylene glycol. The diethylene glycol was of commercial grade, manufactured by the Carbide and Carbon Chemicals Corporation.[4]

Rat group B, seventeen animals, 0.5 per cent in drinking water for from thirty-three to 124 days. No deaths occurred as a result of the procedure.

Rat group C, thirty animals, 1 per cent in drinking water for from thirty-three to 174 days. No deaths occurred from the procedure.

Rat group K, twenty-five animals, 3 per cent in drinking water for from fifteen to ninety-five days. Fourteen died in from five to fifty-six days with extensive degeneration of the renal cortex. The remaining eleven, killed after from fifty-one to ninety-five days, were normal.

Rat group F, thirty-five animals, 5 per cent in drinking water for from one to six days. Nine died in from one to six days as a result of similar renal insufficiency. The remaining twenty-six were killed after from one to six days. The kidneys of twenty-two were also involved, in some cases as early as twenty-four hours after the onset of the experiment. The average daily intake of glycol water in the several experiments was approximately 30 cc. per rat.

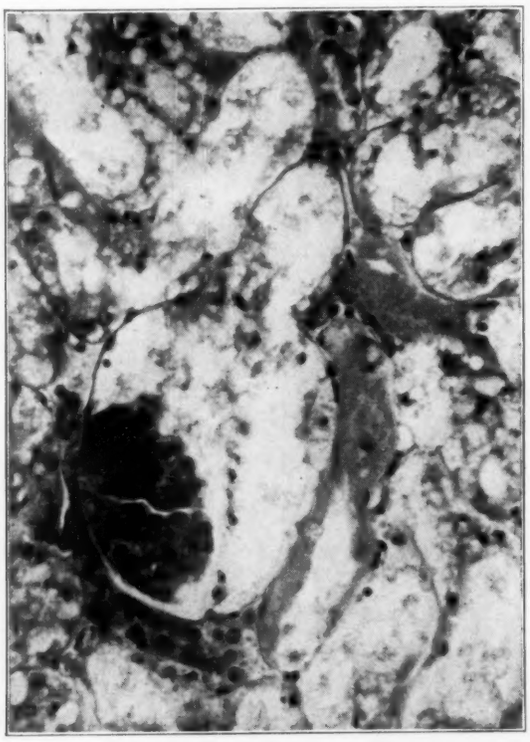

Fig. 2.—Kidney of rat receiving 5 per cent diethylene glycol in drinking water for seventy-two hours. Vacuolization and necrosis of convoluted tubule epithelium. Distention of glomerular space. × 315.

Rabbits, twenty-six adults, received 1 or 2 cc. per kilogram of body weight of pure diethylene glycol or 2 or 4 cc. per kilogram of 50 per cent glycol in a single intravenous injection. Eight died in from one and one-half to eight days following a period of anuria with nitrogen retention. The remaining eighteen rabbits were killed after from one to forty-four days. Half were found to be normal. Half exhibited kidney lesions similar to those in the animals which died spontaneously, in one instance only twenty hours after receiving 2 cc. of diethylene glycol per kilogram of body weight. Control animals on the same stock diet remained normal.

PATHOLOGY

Most of the rabbits passed smoky urine giving a positive benzidine reaction for several hours after the injection. Terminally both rats and rabbits were comatose and often anuric. The blood nonprotein nitrogen rose progressively in both sets of animals to from eight to ten times normal.

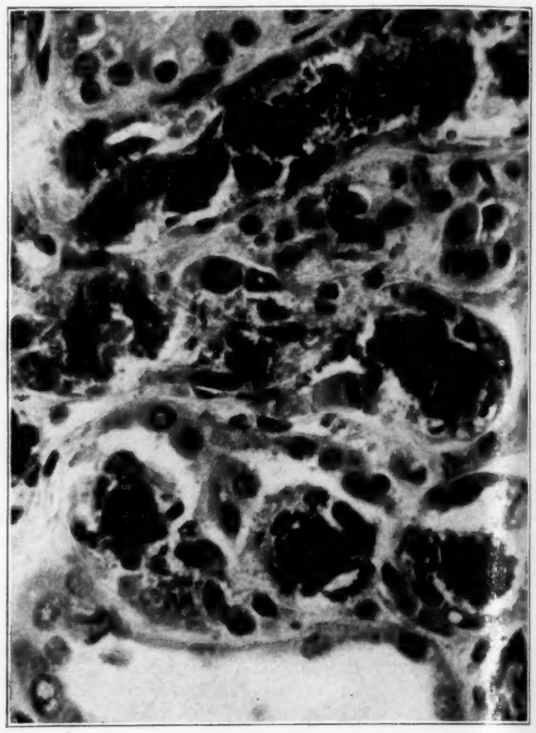

Fig. 3.—Kidney of rabbit receiving 1 cc. of diethylene glycol intravenously. Killed on ninth day. Calcification and regeneration of convoluted tubules. × 460.

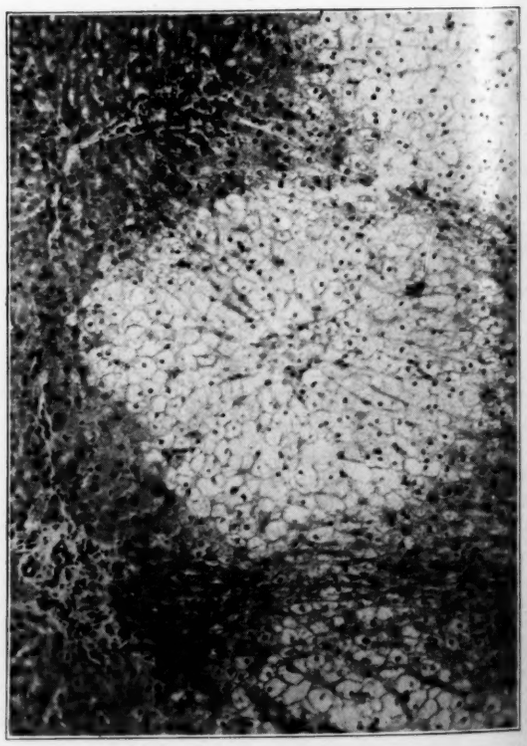

Fig. 4.—Liver of rabbit dying thirty-six hours after intravenous injection of 4 cc. of 50 per cent diethylene glycol. Swelling and vacuolization of liver cells. × 75.

The significant lesions in the affected animals are uniformly in the kidneys, with somewhat less frequent involvement of the liver, and occasionally of the adrenals.

4. Identical lesions have since been obtained in a few animals by the use of redistilled diethylene glycol.

The kidneys are commonly swollen to twice the normal size. The pale yellowish tan cortex is smooth externally and has lost its striations. The medulla often appears congested and moist. Microscopically the process is characterized by widespread, sometimes total, destruction of the epithelial cells of the convoluted tubules. The cells swell and acquire large clear vacuoles which are free of fat and glycogen. This appears to be a form of hydropic degeneration (figs. 1 and 2). Occasionally, however, a little finely divided fat is present in the epithelium of both the convoluted tubules and the glomeruli. Necrotic cells are numerous in the severe lesions. Calcification of necrotic cytoplasm may set in as early as the fifth day in rabbits and attempts at regeneration may be present (fig. 3). The swollen, vacuolated or necrotic cells completely occlude the lumen of the tubules, resulting in dilatation of the glomerular spaces. The glomeruli are often bloodless and compressed but are otherwise essentially uninvolved. Changes in the medulla are confined to congestion and the occurrence of many hyaline and granular casts in the collecting tubules, with occasional fatty changes.

The liver, though less frequently involved, may be enlarged and pale. The cytoplasm of many of the liver cells becomes distended with both large and small vacuoles, which again are free of fat and glycogen (fig. 4). Necrosis is not present.

A similar fat-free vacuolization is sometimes found in the epithelial cells of the outer fourth of the adrenal cortex.

Analogous experiments with ethylene and propylene glycols have not produced comparable lesions. Insufficient work has been done to date with dipropylene glycol and with the mono-ethyl ether of ethylene glycol to warrant a definite statement. The observations suggest that the ether linkage of the di-glycols may be the portion of the molecule responsible for the degeneration of epithelial cells of parenchymatous organs, especially of the kidney.

SUMMARY

Diethylene glycol, administered to rats by mouth and to rabbits intravenously, caused extensive injury to the epithelium of the renal convoluted tubules, leading to urinary obstruction and uremia. The liver and adrenals were less regularly involved.

A dose of from 1 to 2 cc. per kilogram of body weight intravenously to rabbits was required. The ingestion by rats of 0.5 and 1 per cent solutions in their drinking water in quantities of approximately 30 cc. daily per rat for from one to four or five months caused no renal or other symptoms. Three per cent (0.9 cc. per rat daily) in the drinking water killed about 50 per cent of the rats within two months. Five per cent diethylene glycol (1.5 cc. per rat daily) killed 25 per cent within a week.

630 West 168th Street.

Noise Problems in England.—The National Physical Laboratory has made measurements and analyses of many noises of very varied origin. . . . Among the noise problems on which the Laboratory has been consulted in recent years are the mitigation of the noises associated with aeroplane cabins and engine-testing factories, trains, ships, tube railways, busses, motor horns, pneumatic drills, printing works, transformer substations, cathedrals, assembly halls, business offices, flats, miniature rifle ranges, building operations, and so on. Assistance is also being given in connection with the Home Office experiments on air-raid warnings.—Kaye, G. W. C.: Noise and the Nation, *Nature*, Sept. 11, 1937, p. 446.

TORCH OIL DERMATITIS

ITS RELATION TO EPIDERMOMYCOSIS ("RINGWORM")

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The constantly increasing list of materials which are causative agents in the production of disabling industrial dermatoses has in recent years caused justifiable concern to industrial management. Plant physicians and dermatologic consultants are more and more put to the test of solving the difficult questions of etiology, pathogenesis and effective treatment.

The now widely used patch test, as emphasized by the excellent work of Sulzberger,[1] has proved to be especially useful in determining the specific causes of these dermatoses. As a rule, even the well trained observer gets little help in the discovery of cause from the physical appearance of the lesions. The stages of erythema, vesiculation, varying degrees of induration, fissuring, oozing, scaling and pigmentation at one phase or another are common to most industrial dermatoses. The factors of configuration and distribution are not of much help. The removal of the victim from contact with substances to which he shows a positive reaction by patch test may at once clinch the diagnosis and effect a cure. When cure does not follow such a step one invokes the usual explanations, e. g., altered sensitivity to other materials or secondary scratch dermatitis.

The problem here considered is a dermatitis among machinists in a steel mill, for some years past referred to by plant physicians and workers as oil dermatitis. A total of thirty machinists, all of the white race, have been studied to date. Twenty-two complained of an eruption on the hands. These machinists take rolling mill equipment apart, grease it and reassemble it. One step of the operation is to clean machine pieces with torch oil, a crude kerosene.

After working at this job for from six months to a year, the men notice that their hands begin to have a burning sensation and to feel "dried out" after contact with torch oil. These first symptoms are relieved by scrubbing off the oil and greasing the hands with a cold cream or a "palm" oil which is furnished them. After varying periods of time the skin along the lateral margins of the fingers and the dorsa of the fingers and hands begins to have fine, deep seated vesicles which are intensely pruritic. The combination of scratching and further contact with torch oil makes the lesions worse, and the skin soon cracks and oozes. The lesions increase in number and extent until the hands and forearms are involved. The men all reported that the condition becomes aggravated during hot weather and frequently disappears entirely in winter. One man stated that his exacerbations followed attacks of head cold, of which he had many throughout the year. Another man had learned to control his lesions by applying tincture of iodine to new vesicles as soon as they made their appearance.

Read before the Section on Dermatology and Syphilology at the Eighty-Eighth Annual Session of the American Medical Association, Atlantic City, N. J., June 9, 1937.

1. Sulzberger, M. B., and Wise, Fred: The Contact or Patch Test in Dermatology, Arch. Dermat. & Syph. **23**: 519 (March) 1931.

Examination of these workers revealed a uniform process. The earliest lesions were fine, tense, intradermal vesicles, occurring usually in clusters. They were located anywhere on the hands or fingers, but the most common sites were the lateral surfaces of the fingers and the interdigital webs. The older lesions were slightly larger vesicles, in some instances with loose walls. In places with chronic lesions one saw fissuring, oozing, scaling, and "empty vesicles." A

Fig. 1.—Torch oil dermatitis (case 9). The medial surface of the left ring finger shows a small cluster of new vesicles in a chronic patch. Fungi were recovered from lesions of the hands in this case.

common site for chronic lesions was an interdigital web. One worker had superimposed pyodermia. During the period of study a man was observed who had many new vesicles on the hands and a generous crop of identical lesions on the skin of the feet and ankles up to the level of his shoe tops. These lesions had appeared immediately after a very hot week-end during which he had been away from work.

Complete examination of these machinists revealed no other condition common than interdigital erosions and vesiculation, thus indicating clinical epidermomycosis of the toes in varying degrees of activity. Only one was found to be free from such interdigital conditions, and he was one of those who had never had oil dermatitis. On patch test he was found to be very sensitive to torch oil.

The appearance of the oil dermatitis in these cases, its clinical course, the seasonal variation of its activity and its association with epidermomycosis made it seem worth while to investigate the possibility of a compound etiology, especially with respect to primary or secondary manifestation of epidermomycosis superimposed on a chronically irritated skin.

EPIDERMOMYCOSIS AND MYTIDS

Of the wide variety of lesions now known to be caused by fungi one need consider here only interdigital epidermomycosis and its possible sequelae. Its occurrence is almost world wide.[2] One finds nearly all adult industrial workers infected, and it is probable that lesions of the toe are the first manifestations of the disease among this class.

The interdigital lesion changes in appearance according to the stage of its activity. During warm weather and periods of increased foot strain one finds moist, malodorous plaques, occasionally with erythema, vesiculation, oozing and crusting. With the arrival of cooler weather or with decreased foot strain there is subsidence, the lesion frequently presenting no more to the examiner than a shiny surface with a few fine scales between the fourth and fifth toes. Dissemination of the infection from the toes to the moist creases and accessible dry surfaces of the body is external, by way of the patient's own fingers or contact material. The new lesions, as well as their predecessors, harbor fungi, and both are considered foci of primary involvement.

Organisms entering the blood stream from primary foci are probably distributed to the skin of the entire body. Their advent is followed after some time by an altered tissue reactivity (allergy). Subsequent dissemination through the lymphatics or blood stream from a primary focus produces an acute inflammatory response and secondary lesions, mytids (epidermomytids or dermatophytids).[3] Mytids may mimic primary infections to an amazing degree. A common site for their appearance is the hands.

The acute inflammatory reaction which characterizes the development of mytids presumably causes the rapid destruction of any fungi present at the site. Fungi are rarely recovered from these secondary lesions, a fact which must occasionally be relied on to distinguish them from primary foci. The whole process resembles the pathogenesis of tuberculosis of the skin.

Several workers have produced strong evidence in support of this theory. Cleveland White[4] obtained a positive fungus culture from an inguinal node associated with an active eruption on the foot. Peck[5] and others recovered the organism from the blood of patients. Lesions identical with mytids can be produced in allergic subjects by the injection of trichophytin,[6] and injection of trichophytin may cause exacerbation of existing lesions. People who have or have had epidermomycosis react with a local inflammation to intradermal injections of trichophytin; overdoses produce severe systemic reactions.

The possible interrelationship of fungous infections and other known causes of cutaneous disturbances has engaged the attention of other workers. Beerman,[7] in his study of leather dermatitis, concluded that an infection of a fungous nature can produce a polyvalent

Fig. 2 (case 1).—Typical involvement of the backs of the fingers and distal portion of the hand.

allergy of the skin which is responsible for reaction not only to the specific toxin, trichophytin, but to a wide group of substances, among them leather. White and

2. Weidman, Fred D.: Laboratory Aspects of Epidermophytosis, Arch. Dermat. & Syph. **15**: 415 (April) 1927.

3. Williams, Charles M.: The Diagnosis of Some Eruptions on the Hands and Feet, Arch. Dermat. & Syph. **5**: 161 (Feb.) 1922; Dermatophytid Complicating Dermatophytosis of the Glabrous Skin, ibid. **13**: 661 (May) 1926.

4. White, Cleveland: Mycotic Inguinal Lymphadenitis Associated with Superficial Fungus Dermatitis of the Feet, Arch. Dermat. & Syph. **18**: 271 (Aug.) 1928.

5. Peck, S. M.: Epidermophytosis of the Feet and Epidermophytids of the Hands, Arch. Dermat. & Syph. **22**: 40 (July) 1930.

6. Andrews, G. C.: Diseases of the Skin, Philadelphia, W. B. Saunders Company, 1930.

7. Beerman, Herman: Factors Involved in Leather Dermatitis, Arch. Dermat. & Syph. **29**: 671 (May) 1934.

Taub [8] had previously reported eighteen cases of a similar type and were the first to report this phenomenon. They expressed the belief that a fungous infection can cause sensitization of the skin to materials which otherwise are innocuous. Wise and Sulzberger [9] also have contributed to this conception of a polyvalent sensitization by their work on eruptions due to drugs. They said that fungous infections cause the broadening of a sensitization to include other materials and also cause a dermal injury which results in the more effective penetration and action of other materials on the tissues.

The conception of Stokes and Kulchar [10] with regard to this problem seems to be more applicable than the foregoing as an explanation of the pathogenesis in the cases here presented. They described an "infectious allergic complex" involving fungous infections which manifested themselves after the administration of arsphenamine. They cited four patients who had previously exhibited no active epidermomycosis but who, after receiving arsphenamine, had acute epidermomycosis of the hands and feet. Their cases included several flare-ups of epidermomycosis following arsphenamine therapy, in which the arsphenamine was considered a contributing allergic factor.

The thought that dermatosis supposedly caused by a contact irritant might in reality be a fungous disease is not new. Indeed, the appearance of the two conditions is so frequently similar that dermatologists have at times felt called on to warn industrial physicians against the pitfall of passing off a bona fide contact lesion as just another superficial fungous infection. Foerster [11] recently made a strong plea for more careful differentiation, and Wise and Wolf [12] expressed the belief that a diagnosis of typical fungous dermatosis should not be made unless the patient presents an undoubted focus. It is probable, however, that the criterion of a primary focus is at present too easily met, and it seems that a greater consideration of other factors should be made an additional requirement.

EVALUATION OF CAUSATIVE FACTORS

1. *Torch Oil.*—As previously stated, the men take down rolling mill machinery, clean the parts with torch oil and regrease and reassemble them. It was possible to perform patch tests with the oils and greases on twenty-eight of the thirty men studied. The patch test materials were clean grease, old grease, new torch oil and used torch oil (torch oil plus old grease). The two greases were found to be innocuous in all instances.

All the men tested showed some degree of susceptibility to irritation by torch oil. The positive reaction varies from faint erythema to marked inflammation with vesiculation and resembles the type of irritation of the skin one sees with the local therapeutic use of such things as mustard and turpentine. The degree of sensitivity to torch oil seems to vary with the complexion. Light and red-haired persons are readily irritated, and dark-skinned men are not.

Men who show considerable sensitivity to torch oil by patch test do not necessarily acquire chronic dermatitis. In this group of thirty machinists there were twenty-one men whose reactions were read 3 plus or 4 plus. Of these, four had severe cases, five had moderate cases, eight had mild cases and four had no oil dermatitis. The last group presented strong evidence that at least one factor other than susceptibility to irritation enters into the etiology of torch oil dermatitis.

It was found that seven men were only slightly (2 plus or less) sensitive to torch oil. In one instance the irritation was almost insignificant, and the reaction was read a questionable positive. This man had no dermatitis. Of the remaining six, three had mild cases and three others had clear hands.

It was concluded from these facts that a worker who shows little or no irritation by patch test will not have more than a small amount of torch oil dermatitis if he acquires it at all. Further, a man who shows considerable sensitivity probably, but not necessarily, will acquire that condition.

2. *Epidermomycosis.*—It was found that twenty-four men had undoubted interdigital epidermomycosis ("athlete's foot") in varying stages of activity. In five other instances that diagnosis could be made only with reservation, and in one the skin between the toes appeared normal. In none of the last six cases was it possible to examine the skin scrapings. In the five instances in which the diagnosis of interdigital epidermomycosis was questionable, four of the men had no oil dermatitis and one had only a mild case. Patch tests with torch oil in these cases showed considerable irritation in four and moderate irritation in one. Only one man was considered to be free from superficial fungous lesions, and he had no dermatitis of the hands. in spite of the fact that he was a blond who was found by patch tests to be very susceptible to irritation by torch oil. The exposure of these six men to that substance at work was equal to or greater than the average for the entire group.

The twenty-four men who had undoubted fungous lesions on the feet showed great variation in the appearance of their hands. Twelve men were considered to have small but definite involvement between the toes (1 plus). Of these, seven had mild cases of chronic dermatitis on the hands, two had moderate and three had severe attacks. Nine men had a moderate degree of superficial mycotic infection (2 plus). Three of these, whose reactions to patch tests with torch oil were only weakly positive, never had dermatitis. Three others had mild attacks only, and three had from moderate to severe cases. Three workers had considerable interdigital epidermomycosis (3 plus and 4 plus), among whom there were one case of mild and two cases of moderate dermatitis on the hands.

It appears, then, that a man who has torch oil dermatitis must, in the first place, be susceptible to irritation by that substance. This factor is of both qualitative and quantitative importance. In the second place, such a man must have a definite primary focus of superficial fungous infection. The extent and activity of that primary focus do not predict the seriousness of the oil dermatitis nearly as accurately as does the factor of sensitivity to torch oil. From the data here presented one may assume that the disease does not occur in the absence of either factor (tables 1 and 2).

The amount of exposure to torch oil was too uniform throughout the series to warrant its separate evaluation.

8. White, Cleveland, and Taub, S. J.: Sensitization Dermatoses of Nonfungous Nature, J. A. M. A. **98**: 524 (Feb. 13) 1932.
9. Sulzberger, M. B., and Wise, Fred: Drug Eruptions, Arch. Dermat. & Syph. **27**: 549 (April) 1933.
10. Stokes, J. H., and Kulchar, G. V.: The Infection-Allergic Complex in Arsphenamine Dermatitic Reaction, with Special Reference to Dermatophytosis, Brit. J. Dermat. **46**: 134 (March) 1934.
11. Foerster, Harry R.: Observations on Industrial Dermatology, J. A. M. A. **107**: 247 (July) 1936.
12. Wise, Fred, and Wolf, Jack: Dermatophytosis and Dermatophytids, with Particular Reference to Differential Diagnosis of Dyshidrosiform Eruptions of Hands and Feet, Arch. Dermat. & Syph. **34**: 1 (July) 1936.

The usual laboratory procedures gave negative results in all of the cases except one, in which the Kahn reaction of the blood was positive.

DIAGNOSIS OF SUPERFICIAL FUNGUS DERMATOSIS

It seems that the procedures in investigating the possible implication of fungous disease in cases of torch oil dermatitis should be as follows:

1. Establishment of the diagnosis of interdigital epidermomycosis by laboratory methods (direct smear and culture).
2. Examination of material from the lesions on the hands for the presence of fungi.
3. Biologic tests, such as inoculation with trichophytin.
4. Blood cultures, in an attempt to recover circulating fungi.
5. Consideration of case histories.
6. Proper evaluation of therapeutic tests.

TABLE 1.—*Summary of Studies on Men with Dermatitis*

Case	Degree of Dermatitis	Torch Oil Patch Test	Mycosis of Toes	Fungi in Toe Lesions	Results of Treatment	Comment
1	4+	4+	1+	Present	Good	
2	4+	4+	2+	Present	Good	
3	3+	4+	1+	Not examined	Not treated	Quit work; new vesicles after 4 months
4	3+	Not done	1+	Not examined	Not treated	Off 5 weeks; 30% improved
5	3+	4+	2+	Present	Not treated	Fungi present in lesions of hands
6	2+	4+	1+	Present	Not treated	
7	2+	4+	1+	Not examined	Not treated	
8	2+	4+	3+	Present	Not treated	
9	2+	4+	2+	Present	Satisfactory	Fungi present in lesions of hands
10	2+	4+	3+	Present	Not treated	
11	1+	4+	1+	Present	Not treated	
12	1+	4+	1+	Present	Not treated	
13	1+	2+	1+	Present	Good	
14	1+	4+	1+	Present	Not treated	
15	1+	4+	1+	Present	Not treated	
16	1+	3+	4+	Present	Good, slow	Response of toes slow
17	1+	1+	2+	Present	Not treated	
18	1+	4+	1+	Not examined	Not treated	
19	1+	3+	?	Not examined	Not treated	
20	1+	4+	2+	Present	Not treated	
21	1+	1+	2+	Not examined	Not treated	
22	1+	Not done	1+	Present	Good, rapid	Changed occupation

Discovery of a Primary Focus.—There was undoubted physical evidence of interdigital lesions in twenty-four of thirty men studied. It was possible to study material from the toes of sixteen, all of which showed the presence of fungi. It was found that active lesions yield organisms abundantly and that with the exercise of painstaking search fungi are demonstrable in quiescent patches. For good results it is necessary to obtain material from beneath the superficial scales and to clear the preparations with potassium hydroxide for long periods. Both of these steps have been described in detail by Cleveland White.[13]

When speed of diagnosis is not essential, the use of cultures is worth considering. Material obtained from beneath the scales is soaked for about five minutes in 90 per cent alcohol and planted on Sabouraud's medium. There is a characteristic growth of fungi in from ten days to two weeks, which is recognized at a glance by the trained worker and which can be further identified by microscopic examination. The whole procedure is carried out with a much smaller total expenditure of time than one spends in the direct search of fungi in skin material, especially in lesions of low grade activity. The practical value of cultures is materially diminished by the fact that growth does not occur in all cases showing fungi by direct examination. We were able to culture organisms in only three of sixteen cases in which there were demonstrable fungi in material taken from lesions of the toes.

Examination of Material from Lesions of the Hands.—Fungi were searched for in the lesions of the hands in fifteen cases. Vesicles were clipped off at their bases, dried and prepared with potassium hydroxide in the same manner in which material from the toes was treated. Some of the vesicles in each instance were immersed in 90 per cent alcohol and subsequently planted on Sabouraud's medium. In two instances fungi were found by direct examination, and in one of these the organism could be cultured. The lesions in these two cases were, by definition, primary foci of fungous disease. Because in appearance they were indistinguishable from similar lesions on the hands of other patients, it was considered that the latter might be mytids.

Blood Cultures.—Blood cultures were made for six of the sixteen patients who had demonstrable fungi in the lesions on their toes. The routine followed was to add 2 cc. of the patient's blood to 5 cc. of sterile broth. A second portion of 1 cc. was layered on a slant of Sabouraud's medium. No fungi grew by either method. The procedure was carried out with forty other workmen, not machinists, selected because they had acutely active epidermomycosis of the toes and one or more other places (e. g., groin, axilla, gluteal fold). No fungi grew in any case, indicating what is already well known, namely, that it is extremely difficult to obtain positive blood cultures in infections of this type.

The Use of Trichophytin.[14]—Little use was made of this substance. Unquestionably it should have diagnostic value if, when used in small injections or patch tests, new lesions develop or existing ones become worse. That is not, however, to be expected in any appreciable number of instances of proved fungous infections. The usual positive reaction is a papule or a wheal which indicates simply that the patient has had epidermomycosis. Tolmach and Traub [15] reported eight cases in which fungi were demonstrable in lesions on the feet and responses to trichophytin were negative. Seven of their patients presented accompanying vesicular or squamous lesions on the hands.

The facility with which existing primary superficial fungous disease was demonstrated obviated the diagnostic use of trichophytin in the present study. Besides, it was necessary to consider the possibility of severe constitutional reactions, which are said occasionally to occur and which in this study might have had serious medicolegal aspects. Intradermal injections were made on four of the men who never had torch oil dermatitis, and all showed definitely positive reactions.[16] One of these men had no detectable fungous lesion anywhere.

13. White, Cleveland: The Rôle of Fungi in Occupational Skin Diseases, Illinois M. J. **56**: 219 (Sept.) 1929.

14. Sulzberger, M. B., and Wise, Fred: Ringworm and Trichophytin: Newer Developments, Including Practical and Theoretical Considerations, J. A. M. A. **99**: 1759 (Nov. 19) 1929. Council on Pharmacy and Chemistry: Preliminary Report on Trichophytin Extract (Metz Trichophytin), J. A. M. A. **99**: 1779 (Nov. 19) 1932. Andrews.[6]

15. Tolmach, J. A., and Traub, E. F.: Epidermophytids and Trichophytin Reaction, Arch. Dermat. & Syph. **28**: 560 (Oct.) 1933.

16. Dr. Harry P. Jacobson, of Los Angeles, provided a supply of mixed polyvalent fungus vaccine (so-called metaphytin).

and in the other three cases the diagnosis of interdigital epidermomycosis was questionable. No studies of toe scrapings were made in any of these four cases.

Consideration of Case Histories.—Machinists with torch oil dermatitis uniformly have exacerbations in summer and improve rapidly with the onset of cool weather. Plant physicians do not see any cases during the winter. During and immediately after peaks of very high summer temperatures there are flare-ups in patients who were doing fairly well under one form of therapy or another.

As was previously noted, one patient had a marked exacerbation of new vesicles in groups following a hot week-end during which he was away from work. At the same time numerous vesicles developed on the feet, which were suggestive of a phytid reaction on another part of the body identical in appearance with the torch oil dermatitis on the hands.

A second man had an exacerbation after a day's work during which he had worn rubber gloves to protect his skin from torch oil. In this instance the fungous infection was primary on the hands, the organism having been recovered from one of the vesicles.

The effect of withdrawal from exposure to torch oil could be observed when it became necessary for two machinists to leave work for other reasons. In the first instance the man sustained a Colles fracture which caused his absence from the plant for five weeks. During that time he applied phenolated petrolatum to his hands as was necessary to relieve itching. At the end of five weeks during which the weather was continuously hot his dermatitis had improved only an estimated 30 per cent. In the second instance a worker was advised to leave work because of moderately advanced tuberculosis. He was seen at intervals throughout the spring and summer for a period of four months. He improved to an estimated extent of 80 per cent in that time, but at the last interview it was found that a cluster of new vesicles had recently developed along a finger margin. No attempt had been made to treat the oil dermatitis in this case.

Therapeutic Tests.—Previous attempts at the treatment of this condition were uniformly failures. A grand array of standard and proprietary ointments had been used with discouraging results. At the time of this study all the afflicted men were instructed to apply Whitfield's ointment to the hands and to daub the toes with a solution of 10 per cent salicylic acid, 5 per cent benzoic acid and 1 per cent phenol in alcohol. There was rapid and definite improvement in the entire group for a short time, after which the majority ceased reporting for observation and treatment.

A group of eight men continued to be cooperative and were seen daily. Four of these were kept on treatment. Their toes were painted on three successive days with the alcohol solution and for eleven days afterward with tincture of merthiolate (Lilly), and at the end of the two weeks the painting with the alcohol solution was reinstituted. The men took soap and hot water foot baths daily, rubbing off all removable scales with towels. Their hands were kept covered with applications of 10 per cent sulfur and 5 per cent salicylic acid in petrolatum. New crops of vesicles were painted daily with the alcohol solution until they began to dry, usually after three or four days.

The remaining four men were used as controls. They were supplied with good surgical hand brushes and tincture of green soap with which to scrub off all torch oil at the end of a shift. After this cleansing they greased their hands thoroughly with phenolated petrolatum. No treatment was given the feet.

For about two weeks the control group improved more rapidly than did the four treated patients. Soon after the onset of a severe July heat wave, however, the entire control group had exacerbations and asked to be placed on the "ringworm treatment." The two men considered most likely to cooperate were added to the treatment list, and we carried on through the rest of the summer with six men, all of whom continued to do their regular work.

The progress of these six men was considered satisfactory. Complete cures were not obtained in any of their cases, but the men were able to work comfortably all summer and fared much better than any of their fellow workers. At no time during the summer was the dermatitis in any treated patient as severe as it had been in the late spring, when this study was started. The cases in which there was the most extensive epidermomycosis of the toes were those in which therapeutic progress was slowest. In none of the six cases could one be satisfied that the lesions on the toes had entirely cleared.

TABLE 2.—*Summary of Studies on Men Without Dermatitis*

Case	Torch Oil Patch Test	Mycosis of Toes	Fungi in Toe Lesions	Comment
1	4+	0	Not examined	Positive reaction to trichophytin
2	1+	2+	Not examined	
3	4+	?	Not examined	Positive reaction to trichophytin
4	2+	?	Not examined	Positive reaction to trichophytin
5	3+	?	Not examined	
6	?	2+	Not examined	
7	4+	?	Not examined	Positive reaction to trichophytin
8	2+	2+	Not examined	Positive Kahn reaction of blood

BACTERIOLOGIC STUDIES WITH TORCH OIL

Previously to this work it was assumed by the plant personnel that oil dermatitis was a contagious disease. The causative organism was believed to be transmitted through the oil from worker to worker, gaining entrance by way of the small abrasions in the skin which machinists constantly sustain.

A careful inquiry into case histories yielded information which strongly contradicted that theory. One of the first workers to be examined had pyodermia superimposed on his oil dermatitis. Though he had worked in the same torch oil as his fellow workmen for weeks, none of the other men had pus-forming lesions. More conclusive than this evidence was the discovery by some of the machinists that torch oil made a good antiseptic application to scratches and abrasions. Wounds anywhere on the body so treated never became infected and healed rapidly. The use of torch oil in this way is, of course, confined to men who are not readily irritated by that substance.

Experimental work done with the torch oil showed that it was always sterile regardless of how long it had been in use. Small amounts (2 cc.) placed in plain broth, in blood broth or on agar slants never showed growth of any organism.

A culture made in the case of oil dermatitis complicated by pyodermia showed pure Staphylococcus

albus. A loop of this culture spread on a plain nutrient agar slant and immediately covered with a film of torch oil failed to grow. With the substitution of 2 per cent blood agar for plain agar there was a scant growth in twenty-four hours. When a plate of growing colonies on plain agar was covered with torch oil no further growth occurred, but on transplanting those colonies after twenty-four hours under torch oil there was apparently normal growth.

All the colonies of Staphylococcus albus which could be recovered from an agar slant of virulent organisms were transferred to a small vaccine bottle containing about 20 cc. of torch oil and a few sterile glass beads. The vial was shaken vigorously for one minute, after which 1 cc. portions were withdrawn through the rubber stopper by means of a hypodermic syringe and needle and layered on agar slants. There was growth of Staphylococcus albus after five and after ten minutes, but after fifteen minutes the suspension of bacteria in oil was sterile. The experiment was controlled by the substitution of sterile distilled water for torch oil in the vaccine bottle. After one and one-half hours of continuous shaking in a motor-driven shaker there still was growth of Staphylococcus albus.

TORCH OIL BURNING

Very susceptible persons naturally may be irritated more readily by contact with torch oil than were any of the machinists reported on in this study. Such an instance came to our attention when a machinist's helper had an acute vesicular eruption on the hands and fingers after working for only one day with torch oil. The skin of his hands was generally erythematous; the vesicles were uniformly distributed, and not in clusters, and they were superficial and variable in size. The man was removed from contact with torch oil, and in nine days his skin was entirely clear. This acute burning is essentially different from chronic torch oil dermatitis. The latter condition develops only after months of exposure, and the original vesicles are small, uniform in size and deep seated. Further, the vesicles are grouped in clusters, batches appear from time to time and cure does not follow shortly after removal from contact.

COMMENT

Torch oil dermatitis is probably incipient during the first months of a worker's contact with torch oil. At this stage the condition manifests itself subjectively only, with a sense of dryness, tingling and some itching. A few men report that the skin "looks dried out" at that time. The symptoms at this stage are relieved by washing off the torch oil and greasing the skin with any nonirritating oil or grease.

It is probable that the damage to the skin caused by torch oil rests mainly on it solvent qualities and that its chief deleterious action consists of removing the normal skin oils. There is in addition a mild irritation caused by torch oil that is produced by all oils of its approximate volatility and hydrogen unsaturation.[17] This irritation is seen in patch tests on persons of varying susceptibility, and one encounters a rare person in whom acute vesicular eruptions occur from ordinary contact at work. The physical irritation which torch oil causes to the skin varies noticeably with one factor only, the person's complexion.

In the usual case the incipient stage lasts from three months to a year, and then crops of small vesicles make their appearance. It is probable that in most cases these vesicles are epidermomytids. They appear with the coming of the first hot weather, and they usher in the sequence of eczematoid dermatitis: vesiculation, fissuring, oozing, crusting, scaling and discoloration. Workers with no primary foci of fungous infection do not acquire lesions on the hands. The dermatitis becomes aggravated by further exposure to torch oil, which now causes erythema and intense smarting. New crops of vesicles develop from time to time, usually during or just after hot weather. Their appearance is often independent of recent exposure to torch oil.

The conception that a focus of fungous disease might make a worker more susceptible to a contact irritant does not hold here. In the case of one machinist there was no fungous lesion, yet the man was shown by patch test to be very susceptible to irritation with torch oil. Another worker had definite interdigital epidermomycosis, and the reaction to his patch test with torch oil was at most only questionably positive. In neither of these men was there ever any evidence of oil dermatitis. It is probably true that the chronic irritation associated with contact with torch oil alters the skin of the hands in such a manner as to favor the subsequent development of epidermomycosis and mytids. When no focus of primary fungous disease exists there can be no mytids, and when torch oil does not cause appreciable cutaneous irritation mytids fail to appear on the hands in spite of active fungous lesions elsewhere.

SUMMARY AND CONCLUSIONS

1. In the industrial dermatitis of the hands described there probably is an interrelationship between contact with torch oil and the existence of a focus of superficial fungous disease. This conclusion is arrived at through the following observations: (*a*) No case of dermatitis was seen in workers who did not also have interdigital epidermomycosis of the feet; (*b*) fungi were recovered from lesions of the hands in two out of twenty-two cases; (*c*) the clinical course of the affliction closely simulates that of fungous disease, and (*d*) therapeutic measures ordinarily employed in the treatment of epidermomycosis are of unusual value in torch oil dermatitis.

2. The demonstration of a focus of fungous disease is not enough to warrant the incrimination of that infection in the development of an industrial dermatosis. Such foci probably exist almost universally among laborers at the present time.

17. Unpublished material of studies in progress.

ABSTRACT OF DISCUSSION

DR. HARRY R. FOERSTER, Milwaukee: The authors have called attention to a series of cases that represented what in their industry had been considered an occupational dermatosis, so-called torch oil dermatitis, and they have shown that with one or two exceptions these are not cases of torch oil dermatitis but cases of epidermophytid reaction occurring in persons previously sensitized by contacts with torch oil. It is significant that the patients who were examined who had epidermophytosis on the feet and negative patch tests with torch oil failed to develop dermatitis or phytid reactions on the hands. There is apparently an interrelationship between the fungous infection on the feet, the contact and sensitization to torch oil, and the development of phytid lesions. Most dermatologists are familiar with the process by which a fungous infection on the feet or groins, and subsequent phytid reactions on the hands, predispose to the development of contact dermatitis. In the cases presented by Drs. Kammer and Callahan the reverse exists, chemical contact sensitization apparently favoring the development of an epidermophytid reaction. The question may properly be put whether a condition like this

actually occurs or whether these patients may not have previously had mild phytid reactions on the hands that were not recognized by them and did not provoke active dermatitis necessitating medical care but which in turn favored the development of a contact dermatitis subsequently, on continued exposure to torch oil, leading to the development of clinical dermatitis only on the sites of preexisting phytid lesions. This would not produce a picture of diffuse contact dermatitis but of discrete vesicular and squamous lesions at sites of allergic epidermis. The authors have also demonstrated in their investigation the value of patch tests in the study of contact dermatitis and that they are not infallible. They have obtained positive tests when one would expect negative, and they have failed to obtain positive tests when they should logically have appeared. The authors have also demonstrated in their investigation the value of patch tests in the study of contact dermatitis and that they are not infallible. They have obtained positive tests when one would expect negative, and they have failed to obtain positive tests when they should logically have appeared. The authors have also demonstrated the practical value of examination for the fungus in fresh specimens of skin and also, from the point of view of routine office and factory work, the impracticability of Trichophyton tests, blood cultures and cultural growths of skin specimens. The question that arises, if these are accepted as having been phytid reactions in patients sensitized by previous exposure to torch oil, is whether such cases are compensable. I believe that a condition of this type, even though it is not a contact dermatitis, should be accepted as an occupational disease and therefore a compensable disease when it produces disability, because its development apparently requires a combination of circumstances, one of which is occupational.

DR. CLEVELAND J. WHITE, Chicago: The belief of the speakers that the prolonged low grade chemical torch oil contact predisposes the skin of the hands to secondary fungous infection is well received and will be confirmed by other investigators. At Dr. Kammer's invitation I had the opportunity of studying every case history that was outlined here, and I see no flaws in the interpretations given by the authors. The possibility of finding fungi in lesions of the hand is extremely difficult, as we have all found out. If there is anything I might add it is that these cases in which the fungi were not found may well be actual fungous infections rather than phytid on account of the response to therapy. Furthermore, I should say that some conclusions can be accepted from some of our work at Northwestern University Medical School a few years ago in which we took fungi from between the feet and planted them on the back of a rabbit's skin. The fungi quickly changed their morphology, the lesion persisted and in time the fungi disappeared altogether. This phenomenon could account for some of these lesions here. The nonuse of the biologic extracts is to be commended because of the legal angles. They are a double-edged sword and may produce a great deal of trouble, and I feel that the diagnosis was well established without using them. Furthermore, I believe all experience has shown that the use of biologic extracts has not made an exact diagnosis of superficial fungous infection. Like Dr. Foerster, I extend my congratulation to men who are busy in a routine clinic and are not stimulated by the walls of a great research and teaching institution, in the solution of the phase of these eczematous eruptions of the hands.

DR. ADOLPH G. KAMMER, East Chicago, Ind.: In answer to Dr. Foerster's question as to the possibility of the existence of small phytids in these men before they were exposed to torch oil, I cannot give a definite answer. The only thing I can give is the histories of the men; namely, that they had good hands before they began to work. Shortly after the appearance of small vesicles on the hands, the torch oil has a different effect on the men; it then begins to burn intensely and to cause considerable discomfort, and inflammation is evident. There was one man who had lesions, who had been a truck driver in a CCC camp, and he stated that this was simply an exacerbation or a recurrence of the disease which he had as a truck driver. That man had fungi on his hands; he had purely an epidermomycosis.

GLYCERIN, ETHYLENE GLYCOL, PROPYLENE GLYCOL AND DIETHYLENE GLYCOL

REPORT ON FEEDING EXPERIMENTS WITH RATS

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The substitution of diethylene glycol for glycerin as a hygroscopic agent in industry makes it desirable to compare the toxicity of these two chemicals. Both have high boiling points, 245 and 290 C., respectively. Hence, small amounts may possibly pass unchanged with smoke from a cigaret into the body in addition to anything absorbed from the moist end of the cigaret in the mouth.

In view of the rather high toxicity of the related ethylene glycol and because of the use of propylene glycol as a solvent for iodobismitol, it was thought desirable also to include a rough comparison between commercial samples of diethylene glycol and these two related chemicals.[1]

Recent exhaustive studies [2] have shown that glycerin may constitute a large proportion of the food of rats over long periods and that smaller amounts may be added to adequate diets of growing dogs and of man without apparent harm. In fact, the rats showed normal growth and reproduction on such a diet and glycerin could be substituted for part of the food. Only with very large quantities was there diuretic action in dogs and rats. In spite of this favorable report my associates and I decided to include glycerin in our feeding experiments so as to make certain that the rats had the usual tolerance to this compound.

The recent literature dealing with the properties of the glycols is fairly extensive. A comprehensive paper by von Oettingen and Jirouch [3] deals with seven glycols, including ethylene glycol and diethylene glycol. Both caused hyaline shrinking of muscle fiber; ethylene glycol caused a slight and diethylene glycol a questionable hemolysis; methemoglobin formation was absent with ethylene glycol and uncertain with diethylene glycol. The minimal fatal dose in mice was twice as high for diethylene glycol as for ethylene glycol. Both had a slight action on the central nervous system, caused slight hyperemia and muscle rigor and had a slight antiseptic action toward yeast. Diethylene glycol was more depressing to striated muscle than ethylene glycol but had an uncertain depressive action on the intestine as compared to ethylene glycol. Neither caused edema, sensory nerve ending depression or motor nerve fiber depression. The authors concluded:

> Local irritation is comparatively small. Their application to the skin seems to be without risk. Given orally in larger doses they may produce severe gastro-enteritis and systemic symptoms. For intramuscular injection only small doses should be used, else systemic effects may arise. Subcutaneous injections should be avoided on account of local irritation. The intravenous administration would appear to be dangerous, because of the hemolytic action and of the fall of blood-pressure observed with these compounds.

Ethylene glycol was also studied extensively by Hanzlik, Seidenfeld and Johnson,[4] who used both intra-

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Profs. A. J. Carlson and A. B. Luckhardt gave helpful suggestions regarding this problem.

1. These two glycols were supplied by the Carbide and Carbon Chemical Corporation, South Charleston, W. Va.
2. Johnson, Victor; Carlson, A. J., and Johnson, Adelaide: Am. J. Physiol. **103**: 517 (March) 1933.
3. von Oettingen, W. F., and Jirouch, E. A.: J. Pharmacol. & Exper. Therap. **42**: 355 (Aug.) 1931.
4. Hanzlik, P. J.; Seidenfeld, M. A., and Johnson, C. C.: J. Pharmacol. & Exper. Therap. **41**: 387 (April) 1931.

muscular injections and drinking experiments. In chronic feeding experiments on rats, smaller daily doses (0.7 Gm. per kilogram) stunted growth but did not injure the kidney, whereas the higher daily dose of 2.2 Gm. per kilogram caused variable degrees of oxaluria and renal calculi, verifying previous reports. As a solvent for medicinal products with intramuscular injections it was considered "comparatively innocuous." Hunt [5] reported kidney injury by oxalic acid formation when ethylene glycol was administered in the drinking water of different species of animals and cautioned against continued administration of small doses to man. In this and a subsequent paper he [6] also warned strongly against the promiscuous use of ethylene glycol in food products or as a substitute for glycerin. As to propylene glycol he found that, with a 5 per cent solution as the only liquid for drinking, rats showed normal growth and also good tolerance to it when their livers or kidneys had been injured by various poisons; Hunt suggested that propylene glycol may have a "true food value in the sense that ethyl alcohol does, and without the drug action of the latter" Wiley, Hueper and von Oettingen [7] concluded that low concentrations of ethylene glycol vapor in the air (300 mg. per thousand liters) is not toxic when intermittently given to mice or rats as judged by weight curves and histopathologic examinations, although one of ten rats and three of twenty mice died during the tests with 398 mg. per thousand liters for eight hours a day, five days a week, sixteen weeks, with no controls to show that similar mortality would occur in untreated rats and mice.

In their extensive study on bismuth excretion in rabbits and patients, Hanzlik, Mehrtens and Spaulding [8] used ethylene glycol as the solvent for iodobismitol without any untoward effects by this glycol. Seidenfeld and Hanzlik [9] found propylene glycol to be much less toxic than ethylene glycol in injection and feeding experiments as judged by animal growth and tissue appearance by microscopic examination. No demonstrable accumulation effects were seen with concentrations of from 1 to 10 per cent in the drinking water. However, propylene glycol did cause somewhat greater local irritation than ethylene glycol. Finally, Hanzlik, Mehrtens and Spaulding,[10] in a comparison of propylene glycol and diethylene glycol, concluded that iodobismitol prepared with propylene glycol is less toxic and prepared with diethylene glycol is more toxic systemically than ordinary iodobismitol prepared with ethylene glycol.

Haag and Ambrose [11] report that concentrations of 3 and 10 per cent, respectively, of diethylene glycol in the drinking water of rats proved rapidly fatal.

TOXICITY OF DIETHYLENE GLYCOL [12] IN FOOD AND WATER AND THAT OF GLYCERIN IN FOOD, AND ETHYLENE GLYCOL AND PROPYLENE GLYCOL IN WATER

The results of an eleven weeks experiment show that female rats 4½ months old on a control diet of fox-chow (Purina Mills) and water gained in weight about to the same extent as did those who had eaten fox-chow containing 20 per cent glycerin or 20 per cent water.

However, the fox-chow containing 20 per cent diethylene glycol killed five of six rats within four weeks. One kidney (found to be normal) was removed from the sixth sick rat after two weeks; on a normal diet this rat promptly recovered. When the fox-chow contained 10 per cent diethylene glycol, three of five rats died within eight weeks, but one showed normal gain in weight. From the fifth rat, which was losing weight, one kidney (found to be normal) was removed after the eighth week. On our control diet this rat recovered promptly. With fox-chow containing 5 per cent diethylene glycol, one out of six rats died after seven weeks and another after ten weeks. Of the remainder, one showed but a slight increase in body weight and the other three had made approximately normal gains.

When the drinking water contained 5 per cent diethylene glycol, the toxicity was markedly greater. All five rats died within eleven days (average duration of life, eight days). However, an equimolecular solution of commercial ethylene glycol (2.92 per cent) was even more toxic, killing all six rats within six days (average duration of life, four days). On the other hand, an equimolecular solution of commercial propylene glycol (3.58 per cent) was much less harmful than that containing the diethylene glycol. One of the six rats died after the tenth week and one had lost considerable weight at the end of the eleven weeks. The remaining rats were beginning to lose weight at the end of the experiment. Thus, the commercial propylene glycol appears to be more toxic than the highly purified substance administered to rats by Hanzlik and his associates [9] or the propylene glycol used by Hunt.[13]

Further analysis of the food and water intake showed that with fox-chow containing 20 per cent glycerin the rats ate 23 per cent less fox-chow per day than the ones fed pure fox-chow; but they ate only 11 per cent less than those who had had fox-chow with 20 per cent water as their food. The average daily consumption of glycerin was 2.7 Gm. As to water intake, no conclusion seems warranted because the rats who ate fox-chow containing 20 per cent water drank considerably more water than did the controls, indicating that there may be considerable variation in drinking habits even with animals of nearly the same size.

Considering fox-chow consumption per average hundred grams of gain in body weight during the eleven weeks, 11 per cent less of actual fox-chow was needed when the fox-chow contained 20 per cent of glycerin, indicating that glycerin was used as a food substitute.

The average daily fox-chow consumption was 6 per cent less than in the controls when the fox-chow contained 5 per cent of diethylene glycol. When it contained 10 per cent, the fox-chow consumption was 10 per cent less, or about the same as when the fox-chow had 20 per cent of glycerin. Considering again the small number of animals, these differences are not significant. However, the large increase in the average daily water intake (75 per cent) when the fox-chow contained 10 per cent of diethylene glycol may indicate an attempt to wash down the ill tasting food with water.

When the diethylene glycol proportion in the fox-chow reached 20 per cent, the average daily fox-chow consumption declined sharply to 24 per cent of the control value in these quickly dying rats. The even

5. Hunt: Indust. & Engin. Chem. **24**: 361, 1932.
6. Hunt: Indust. & Engin. Chem. **24**: 836, 1932.
7. Wiley, F. H.; Hueper, W. C., and von Oettingen, W. F.: J. Indust. Hyg. & Toxicol. **18**: 123 (Feb.) 1936.
8. Hanzlik, P. J.; Mehrtens, H. G., and Spaulding, J. B.: Iodobismitol, Arch. Dermat. & Syph. **29**: 298 (Feb.) 1934.
9. Seidenfeld, M. A., and Hanzlik, P. J.: J. Pharmacol. & Exper. Therap. **44**: 109 (Jan.) 1932.
10. Hanzlik, P. J.; Mehrtens, H. G., and Spaulding, J. B.: J. Pharmacol. & Exper. Therap. **49**: 300 (Nov.) 1933.
11. Haag, H. B., and Ambrose, A. M.: J. Pharmacol. & Exper. Therap. **59**: 93 (Jan.) 1937.
12. This diethylene glycol was furnished by the Miner Laboratories of Chicago; it was the kind used in our cigaret experiments. The Miner Laboratories also furnished the glycerin.
13. Hunt (footnotes 5 and 6).

sharper reduction in the average daily water intake to 18 per cent of normal indicates that these rats became too sick even to drink.

When the water contained 5 per cent of diethylene glycol, the reduction in average daily eating of fox-chow was even more severe than when the fox-chow had contained 20 per cent of diethylene glycol; the intake went down to 17 per cent of normal. The average daily water intake was also markedly diminished to 31 per cent of normal.

When the water contained an amount of ethylene glycol equimolecular with the 5 per cent diethylene glycol, the average daily consumption of fox-chow was nearly twice and the average daily water intake nearly three times that of the rats that had been drinking 5 per cent diethylene glycol; thus the water intake was nearly normal. Therefore, on an average, the rats took in 2.7 times more ethylene glycol molecules daily than those of diethylene glycol, which may partly explain why they were dying twice as rapidly.

When an amount of propylene glycol equimolecular with the 5 per cent diethylene glycol was present in the water, the rats ate and drank approximately as much as the control rats; thus, on an average they took in three times as many propylene glycol molecules daily as when diethylene glycol had been added to the water. The latter fact further emphasizes the much greater toxicity of diethylene glycol as compared with propylene glycol.

A COMPARISON OF THE EFFECTS OF GIVING VARYING CONCENTRATIONS OF PURE DIETHYLENE GLYCOL (EASTMAN) IN THE DRINKING WATER OF YOUNG RATS

Because the toxic effects following administration of commercial diethylene glycol may possibly have been due to impurities, we added a nine weeks experiment in which pure diethylene glycol was added in varying amounts to the drinking water of rats which were from 7 to 8 weeks old; concentrations started at a level 20 per cent lower than the one that had killed all rats within eleven days. This new concentration of pure diethylene glycol was thus 4 per cent; it killed three of the five rats within nine days, but the other two survived.

On the lower concentrations of 2, 1, 0.5, 0.25 and 0.125 per cent, respectively, of diethylene glycol, no animals died. However, the average actual and percentage gains in body weight during the nine weeks was less than half of that of the controls. Not until the concentration had become as low as 0.125 per cent were these growth averages exactly up to the control values.

Looking next on the average daily amounts of fox-chow eaten, the values are 24 per cent lower than the control intake when the water contained 2 per cent of diethylene glycol. In case of the two highest concentrations (2 and 1 per cent, respectively), there was also a noticeable diminution in actual water intake to 59 and 67 per cent of normal, respectively.

With the higher concentrations of pure diethylene glycol in the water there were dark discolorations around the genitalia; these were not blood; this indicates that diethylene glycol or some darker decomposition product was being passed in the urine. Thus, some diethylene glycol was being absorbed.

In the case of the rats which died acutely from diethylene glycol poisoning, the stomach and intestine showed signs of marked local irritation and in some cases considerable blood and local injury.

Comparing the liver, kidney, lung and myocardium of the rats that had been given commercial ethylene glycol, propylene glycol, diethylene glycol or glycerin in the food or water with those of the control rats, no certain damage was demonstrable to these vital organs as judged by examinations of sections stained with scarlet red or with hematoxylin and eosin. These examinations were done by courtesy of Dr. Paul R. Cannon.

Considering the same four organs of the rats which had been given varying concentrations of the pure diethylene glycol in the drinking water, no certain damage could be seen in the liver, kidney or lung. Dr. Eleanor Humphreys, who carried out these examinations, reported an indication of a possible slight change in the myocardium with the three highest concentrations as judged by the hematoxylin and eosin staining technic, but it was slight and not present in all cases.

COMMENT

The results of these experiments place diethylene glycol between ethylene glycol and propylene glycol in toxicity. A high concentration of glycerin in the solid food (20 per cent) seemed harmless. Diethylene glycol in one fourth of this concentration in the fox-chow and in much smaller concentrations in the drinking water was distinctly harmful as judged by cases of mortality, stunted growth in the young, and impaired reproductive capacity.

Even after prolonged administration of diethylene glycol in the concentration employed, however, visible microscopic changes in the liver, kidney, lung, heart and testis were absent. Both the frozen section method and the staining with hematoxylin and eosin were used in the first four of these tissues. Although diarrhea was not observed, I believe that the absence of pathologic changes in these vital organs may indicate that local irritation probably is an important factor in the toxicity.

Because the rat in some cases is much more tolerant to poisons than man, for example, to atropine, and in other cases shows peculiar susceptibilities, for example, delayed death after slightly hypnotic doses of nostal, we do not know with certainty what the relation is with diethylene glycol. However, the report by Hunt [6] of greater susceptibility of man to ethylene glycol than the rat—comparing the per kilogram dosage—probably means that man is also more susceptible to diethylene glycol.

SUMMARY

1. In an eleven weeks experiment, younger adult female rats gained about the same in body weight as control animals when a high concentration of glycerin (20 per cent) was mixed with their solid food

2. Similar concentrations of commercial diethylene glycol killed all rats within about two weeks, and even 10 and 5 per cent proved fatal to some of the rats. Diethylene glycol is even more toxic when added to the drinking water. When the rats drank from a 5 per cent solution, the average duration of life was only eight days.

3. With the equimolecular concentration of commercial ethylene glycol (2.92 per cent) in the drinking water, the rats lived only an average of four days but actually had consumed 2.7 times as many molecules of ethylene glycol per rat daily.

4. With an equimolecular concentration of commercial propylene glycol in the water (3.58 per cent), one rat died at the tenth week, one was sick and others were beginning to lose weight at the end. The average daily

intake was three times as many molecules of propylene glycol as of diethylene glycol. This places diethylene glycol between ethylene glycol and propylene glycol in toxicity, but nearer the first one.

5. When pure diethylene glycol was added to the drinking water of 2 months old female rats, some died with the highest concentration of 4 per cent and growth was markedly stunted at this level. Even in the concentration of 0.25 per cent, some indication of impaired growth was detectable.

6. That diethylene glycol was being absorbed with the higher concentrations was indicated by discolorations around the genitalia. With high concentrations, local injury and bleeding of the stomach and intestine were frequently seen in the fatally poisoned rats.

7. In microscopic examinations of the liver, kidney, lung and myocardium the only possible change seemed to be a slight one in the myocardium with 1, 2 and 4 per cent of pure diethylene glycol, respectively, in the drinking water; but even this change was not uniformly present and hence may not be significant. Both the frozen section method and the hematoxylin and eosin staining method were employed.

8. Pregnancy did not occur when males and females were mixed and both received 0.5 per cent of pure diethylene glycol in the drinking water. There was some indication of smaller and fewer litters in females receiving 0.25 and 0.5 per cent in the drinking water when mated with frequently changed fresh stock males.

COMMUNICABLE DISEASE CONTROL IN PRIVATE PRACTICE

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Physicians who elect to immunize children against smallpox, diphtheria, scarlet fever, pertussis and typhoid fever are confronted by the practical problem of deciding when to administer each prophylactic procedure. A partial solution of this problem probably can be accomplished through the tendency displayed by young infants to be rather refractory to diphtheria and scarlet fever throughout a considerable period during which they are quite susceptible to smallpox and pertussis. This tendency apparently justifies observance of the general policy of temporarily deferring immunizations against diphtheria, scarlet fever and typhoid fever in order that smallpox vaccinations and pertussis inoculations may be completed in the first six months of life.

Whether smallpox vaccinations should usually precede or follow pertussis inoculations is a debatable question. The customary failure of successful smallpox vaccinations when performed during the first three months of life to cause appreciable systemic reactions is a practical point in favor of the early administration of this preventive measure. Also the greater prevalence of whooping cough and its seriousness during infancy can be advanced as important reasons for giving precedence to pertussis inoculations.

Obviously, many factors deserve consideration when the details of individual programs of immunization are outlined. We venture, therefore, merely to suggest that smallpox vaccinations and pertussis inoculations be performed under the age of 6 months and that immunizations against diphtheria, scarlet fever and typhoid fever be administered in the following twelve or more months (table 1).

During the past three years we have inoculated 335 children with Sauer's pertussis vaccine (table 2), in most instances between the ages of 3 and 12 months and in the recommended total dose of 8 cc. An average of one and three-tenths years has elapsed since this series was inoculated, and in this interval two members of the group had pertussis, eleven and fourteen months after immunization, respectively. In one instance the disease was of moderate severity, and in the other case it was rather mild.

Reactions such as fever and edema, erythema and soreness of the arm have been reported occasionally when full doses of the vaccine were injected. Reports of this character practically disappeared when the plan of giving the vaccine to young infants in six semiweekly or weekly half doses was tried.

During the past six years we have administered 135,000 or more skin test units of Dick's scarlet fever toxin to each of a series of 526 children (table 2). Owing to some uncertainty on our part relative to the value and significance of the Dick test, this test was not applied as a matter of routine after immunization.

When the toxin was given in five separate doses disturbing reactions, which included vomiting, urticarial and scarlatiniform rashes, joint pains, fever and soreness of the arm were reported with considerable frequency. Although various methods were used to avoid these disturbances, their incidence did not decline appreciably until the plan of giving the toxin in ten semiweekly or weekly half doses was tried. According to our experience, parents generally feel that the avoidance and the attenuation of the reactions which may attend scarlet fever immunization more than compensate for the inconvenience of five extra visits to the office.

Since we administered Dick's scarlet fever toxin to this series of 526 children, an average postinoculation period of two and seven-tenths years has elapsed, and in this interval four members of the group had a mild form of scarlet fever. The disease appeared two months after the completion of inoculations in one instance, and in the remaining three patients the development of scarlet fever postdated the immunization by six or more months.

Owing to a lack of comparable control groups, the observations made on the two series of children immunized against pertussis and scarlet fever obviously justify no attempts to estimate the degree of specific protection that each of the two procedures produced. Nevertheless, the observations demonstrate that inoculations against pertussis and scarlet fever with currently recommended amounts of each material may occasionally fail to produce adequate protection against the disease the immunization in question is specifically supposed to prevent. Our experience in private practice has failed to disclose comparable failures relative to the effectiveness of smallpox vaccination and diphtheria immunization.

Carefully controlled Schick tests applied in 1936 to 3,205 freshmen at Minnesota University with an average age of 18 years yielded positive reactions in 70.1 per cent of the group (table 3). This series of students consisted largely of native residents of Min-

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Read before the Section on Pediatrics at the Eighty-Eighth Annual Session of the American Medical Association, Atlantic City, N. J., June 11, 1937.

nesota who had lived in the state during a period in which the local morbidity rate for diphtheria was falling rapidly to relatively low levels. Whether the high incidence of apparent lack of immunity to diphtheria observed for these young adults is evidence that environmental conditions, which normally operate to produce a naturally acquired immunity, decline when the local prevalence of diphtheria falls is a highly speculative but nevertheless provocative question. Regardless, however, of what the correct answer to this question may be, it seems quite obvious that the practice of administering protective inoculations against diphtheria should be greatly increased.

TABLE 1.—*Suggested Program of Immunization*

Period of Life	Procedures
First half year.....	Smallpox vaccination, pertussis inoculations
Succeeding months....	Inoculations against diphtheria, scarlet fever, typhoid fever

TABLE 2.—*Records for Children Immunized Against Pertussis and Scarlet Fever*

Material Used for Immunization	Number of Children Inoculated	Number That Later Had Pertussis or Scarlet Fever	Average Length of Post-immunization Period, Years
Sauer's pertussis vaccine.....	335	2	1.3
Dick scarlet fever toxin.....	526	4	2.7

Evidence which indicates that the immunity to diphtheria produced by inoculating children during a decade characterized by a low local prevalence of the disease tends to persist at a satisfactory level is provided by the results of a survey of 215 Minneapolis children made at the end of an average interval of six and seven-tenths years after they had been rendered negative to the Schick test by inoculations (table 4).

When the follow-up tests were read on the fourth day after their application, 14.9 per cent of the children presented some degree of erythema (table 4). Since control (Moloney) tests were not used, it was impossible to determine whether these erythematous responses indicated a loss of immunity or the presence of a mild degree of sensitivity produced by previous inoculations.

Of greater significance is the observation that 85.1 per cent of the group of 215 adequately immunized children failed to react to Schick tests applied at the end of an average postinoculation period of six and six-tenths years. This fact is interpreted as evidence that the immunity to diphtheria produced in children by inoculations administered during an era characterized by a low morbidity rate for diphtheria usually persists for several years at a satisfactory level. Apparently the retention of an adequate artificially induced protection against diphtheria seems to be largely independent of how the incidence of the disease is shifting in the local environment. If this speculation is correct, diphtheria immunization doubtlessly will supply present and future needs for the specific protection it confers.

Although tuberculosis is a preventable disease, its control is nevertheless difficult. Since the development of a vaccine capable of producing an effective and sustained immunity to tuberculosis probably will remain an experimental problem for many years, the eradication of this communicable disease doubtless will long continue to be contingent on the prevention of infection with virulent tubercle bacilli. In view of these probabilities, a brief consideration of what perpetuates tuberculosis in man seems to be appropriate.

The first evidence presented here on this point was provided by a tuberculin-sensitive patient who had extensive bilateral pulmonary infiltrations in 1926. The subsequent spontaneous resolution of these lesions, which led ultimately to their reduction to relatively trivial calcified deposits, serves to identify the antecedent infiltrations as examples of the pneumonic stage of tuberculosis of first infection. During the fifth post-infection year, tuberculosis of the lumbar spine developed. In another instance, x-ray study revealed the presence of well calcified hilus glands and a Ghon tubercle in the left lung of a child who also had tuberculosis of the spine. Similar roentgenographically demonstrable deposits, which were interpreted as visible evidence of antecedent tuberculosis of first infection, were found coexisting with tuberculosis of bones and joints in 70.7 per cent of 123 additional patients. These observations seem to provide an answer to the question Do antecedent infections with virulent tubercle bacilli prevent the occurrence in man of tuberculosis of bones and joints?

The highly communicable chronic pulmonary tuberculosis of the so-called adult type outranks all other forms of the disease as a cause of death and as a menace to the health of the public. Some of the evidence secured at Lymanhurst relative to the antecedent events that are indispensable for the occurrence in man of this important condition is submitted for consideration.

Follow-up studies in 1933 on one patient who was sensitive to tuberculin in 1928 but had no roentgenographically demonstrable primary disease revealed the development of extensive and ultimately fatal pulmonary tuberculosis. Initial study of a second tuberculin-sensitive patient disclosed nothing but well calcified hilus glands on the right side. Ten years later this child had extensive pulmonary tuberculosis throughout the left lung. In a third typical case, x-ray study in 1931 dis-

TABLE 3.—*Results of Controlled Schick Tests Applied to Freshman Students During 1936* *

Total Number of Students Tested	Students with Positive Schick Reaction		Average Age When Tested, Years
	Number	Per Cent	
3,205	2,247	70.1	18

* Data of Ruth E. Boynton.

TABLE 4.—*Interpretation of Schick Tests Applied to 215 Children Who Previously Had Been Rendered Negative to the Schick Test by Diphtheria Immunization*

Interpretation of Schick Test	Patients in Each Group		Average Length of Post-Inoculation Period, Years
	Number	Percentage	
Marked erythema.....	1	0.5	9.9
Moderate erythema.....	22	10.2	7.5
Slight erythema.....	9	4.2	6.7
Total.....	32	14.9	7.4
Negative.....	183	85.1	6.6
Grand total.....	215		6.7

closed a pneumonic appearing infiltration in the midlung field of the left lung. This infiltration resolved spontaneously and left a few calcifications in the region of the hilus. During 1935 extensive phthisis was found in the opposite lung.

Mile posts which identify stages in the evolution of pulmonary tuberculosis are occasionally disclosed when extensive disease is present at the time of the first x-ray study. This is illustrated by a patient whose initial roentgenogram of the chest revealed a well calcified Ghon tubercle at the base of the right lung coexisting with far advanced bilateral pulmonary tuberculosis.

The records of these few illustrative cases exemplify the development of chronic pulmonary tuberculosis as it has been observed to occur in many Lymanhurst children who, previous to the appearance of this serious condition, were sensitive to tuberculin but otherwise seemed to be healthy. These observations on children are considered to be on a par with experiments on animals in suggesting the correct answer to the question Do antecedent primary infections with virulent tubercle bacilli prevent the occurrence in man of the highly contagious chronic pulmonary tuberculosis of the so-called reinfection or adult type?

Instead of attempting to analyze the relationship of primary tuberculosis to various other reinfection forms of the disease, we desire merely to state that sixteen years of follow-up study conducted at Lymanhurst have produced no evidence that an antecedent infection with tubercle bacilli prevents miliary tuberculosis, tuberculous meningitis, chronic pulmonary tuberculosis, osteoarticular tuberculosis or any of the numerous additional important forms of the disease that occur in man. Apparently the primary tuberculous complex fails to prevent these various conditions in almost the same manner that a syphilitic chancre fails to prevent gummas, tabes dorsalis and dementia paralytica.

These observations lead us to believe that the control of tuberculosis is contingent exclusively on taking advantage of the inability of the causative agent of the disease to perpetuate itself and to survive through successive generations of the human race if the transmission of tubercle bacilli from person to person is prevented.

The promotion of comprehensive programs of control designed to identify human disseminators of tubercle bacilli requires the cooperation of physicians engaged in private practice, who obviously are in an excellent position to survey systematically the personnel of numerous household units. As a preliminary step, the physician may employ the tuberculin test for the purpose of quickly and accurately differentiating the infected from the uninfected members of each unit. Subsequently, the search for the open cases of tuberculosis that obviously require segregation can be completed by conducting periodic clinical, laboratory and x-ray examinations of each patient in whom the preliminary step of the survey disclosed infection.

If this preferred method of thoroughly canvassing the household cannot be financed, there is the economical alternative not only of temporarily deferring x-ray studies and other relatively expensive examinations in instances in which the preliminary tuberculin tests have demonstrated a failure of infected parents to contaminate their respective children, but also of continuing this policy as long as periodic retestings show that infections are not spreading to previously uncontaminated members of the household. According to this plan, the results of initial and follow-up surveys with tuberculin tests are relied on as providing dependable evidence that no open case of tuberculosis is present in the unit concerned. This scheme automatically concentrates the more expensive methods of examination where their use is indispensable; namely, on the tuberculin-sensitive members of units in which infected children are present or in which contaminations obviously are spreading. If used judiciously in conjunction with the preferred plan of thoroughly canvassing households, the economical method for detecting homes in which previously unrecognized human disseminators of tubercle bacilli are present materially augments the scope of surveys conducted in private practice without the aid of special subsidies.

The effective control of bovine tuberculosis accomplished by the American veterinarians, who started in 1920 with herds thoroughly accredited only in the District of Columbia and succeeded during the next two decades in accrediting the herds of practically all states in the Union, suggests that the promotion of a comprehensive program designed to prevent the spread of tubercle bacilli from person to person should have a similar effect on tuberculosis of human origin. Consequently, physicians engaged in private practice are urged to conduct individual tuberculosis surveys on the household units under their care. These surveys, combined with those being sponsored by different clinics and organizations, doubtless should accelerate the eradication of the human source of infection, which now is almost exclusively responsible for the occurrence of tuberculosis in successive generations of man.

78 South Ninth Street.

ABSTRACT OF DISCUSSION

DR. LEE FORREST HILL, Des Moines, Iowa: The plan presented for carrying out immunization procedures is important if one is to apply the protective inoculations at the optimum time for greatest effectiveness. It enables one to supplant haphazard programs with definite ones based on known facts concerning the individual peculiarities of the various disease processes. It was not the purpose of the authors to include whooping cough and scarlet fever immunizations among those of unquestioned reliability but rather to indicate the age period when they should be given. Certainly the present evidence points to the need of considerably more support before one can accept either whooping cough or scarlet fever prevention as procedures that can be recommended by the physician as being on the same level of effectiveness with diphtheria and smallpox. My experience with Sauer's vaccine has not been as favorable as the authors'. Of about 200 children given the vaccine, five have subsequently developed whooping cough. While such results should not condemn the method, they have caused me to be cautious in what I promise parents. In considering the desirable age for administering whooping cough vaccine one has in mind the high mortality of this disease in infancy, but on the other hand one remembers the experience of Madsen, who reported one or two fatalities in very young infants, following the inoculations. The suggested age by the authors of 6 months would seem fairly satisfactory. Present knowledge indicates that the optimum age for diphtheria immunization is in the neighborhood of the ninth month. In those situations in which no immunizations have been carried out before this age period has been reached and the question arises as to which should be given first, my own opinion is that preference should always be given to those of proved value, such as diphtheria and smallpox. The proposal of Drs. Stewart and Platou to give the whooping cough and scarlet fever immunizations in a greater number of small doses seems desirable if uncomfortable reactions are to be avoided. I am glad to see the authors include tuberculosis among the list of acute communicable diseases. The epidemiologic features of tuberculosis have not

received the attention they deserve. The tuberculin test is undoubtedly being used much more extensively, but still not to the limit of its possibilities. The plan proposed of regarding the family in which tuberculosis exists in any form as a unit for continuous study with the thought uppermost in mind of detecting the spreader of bacilli or of instituting treatment to prevent future spreading of bacilli is the plan which at the present offers the greatest promise of future control of tuberculosis.

DR. HENRY T. PRICE, Pittsburgh: There are two obvious ways of lessening the local and systemic reactions of immunization procedures: first, modifying the toxin, as in diphtheria toxoid; second, giving the inoculation during the first year of life when the infant's response to the inoculation is mild. The latter method has been less frequently chosen, and one views with interest Stewart and Platou's experiments with pertussis immunization during the first three months of life. It is not clear whether the refractory state in the young infant to certain infections is due to passive immunity transmitted from the mother, to absence of skin reaction, or to an inherent resistance brought about by a unique chemical organization, of the first growth period of life. My observations, concerned mainly with immunization against scarlet fever with a chemical fraction of Streptococcus scarlatinae, confirm the observations of Stewart and Platou regarding the decreased reaction during the first and early years of life. A total of 3,000 children in three public school districts tested for susceptibility to scarlet fever showed an average of 50 per cent positive reactors. These reactors have been immunized; two of these groups have been followed for one year, the third group for two years. Practically no systemic reactions have occurred; about half of the older children and adults developed soreness at the site of the injection. Children under 7 years of age received four injections; older children received five. Immunization developed slowly; 70 per cent tested became negative at the end of one year and the remaining 30 per cent required two years to become negative. The various factors responsible for delaying the development of immunity in certain individuals are not at present known, although allergy seems to be an important one. An interesting observation was the almost complete elimination of scarlet fever from a community where a considerable part, but not all, of the susceptible individuals were immunized. It remains to be seen whether the period of protection induced by the immunization against scarlet fever with modified material will be shortened, as is the case with diphtheria toxoid. Artificially produced immunity is probably never absolute and is modified by many factors, among which are general resistance, allergy and race.

DR. HERMAN SCHWARZ, New York: I should like to say a word about the importance of the tuberculin test. For the last seventeen years I have done a test on my children twice a year. I have always been at a loss to understand why even the pediatricians haven't made use of it. I am delighted that the authors brought that up today. It is so simple. When I tried to introduce it into the private school where my children go, I was unable to do it. My old colleagues in New York and elsewhere have said "What's the use?" Of course, when one has domestic servants it is increasingly important. If one of my children should show a positive tuberculin test, I would look for the sources in my household. If we do anything as children specialists, I believe we should certainly popularize this test. As the authors have so well said, as we have done for the animal we should do for man.

DR. CLIFFORD D. SWEET, Oakland, Calif.: I want to commend Drs. Stewart and Platou for emphasizing the importance of using the tuberculin test. Every new patient should have a carefully done tuberculin test. All patients who have an annual health examination in the pediatrician's office should have a tuberculin test. I am not going to wait for a child in my family to develop a positive tuberculin test before I examine the servants. I will not take a servant into my house unless that servant first has a physical examination, including a roentgenogram of the chest; and I so advise the parents of the children whom I take care of. When a child has a positive tuberculin test I agree thoroughly that his environment should be searched carefully, including especially the aging grandparents who perhaps visited six months earlier. I think that three doses of toxoid for immunizing the child against diphtheria are much better than two doses. My own experience is that 1 year of age is a better time than 6 months or even 9 months. I am quite certain that one should not promise parents anything from immunization against whooping cough with Sauer's vaccine, although I am carrying it out as a matter of routine at 8 months of age, saying to the parent that if it will protect the child, even in part, for one year, it is well worth doing. Performed in divided doses, as Drs. Stewart and Platou have indicated, it did not give unfavorable reactions. One should not attempt to do too many immunizing procedures to the infant during the first year of his life. I think that smallpox, diphtheria and whooping cough are enough. Typhoid immunization doesn't last above two years or is not to be trusted, and in the ordinary community, with its usual safeguards, and with pasteurized milk, I think we may let typhoid go. I don't think we should attempt to immunize all children against scarlet fever. I have not yet immunized my first one. I think the rash is an allergic reaction. We are probably protecting them from the rash, while we still leave them susceptible to the infection and all the complications of scarlet fever.

DR. PERCIVAL NICHOLSON, Ardmore, Pa.: I take exception to Dr. Sweet's remarks and believe active immunization against scarlet fever practical and of distinct value. In the Philadelphia Hospital for Contagious Diseases in a ten year period (1926-1936) 615 nurses were subjected to the Dick test and positive reactors were given active immunization; none developed scarlet fever. Immunization was discontinued for fourteen months, and twelve nurses developed scarlet fever. After resumption there were no further cases. In nine years (1927-1936) other Philadelphia hospitals not using active immunization sent to the Hospital for Contagious Diseases 196 nurses with scarlet fever. They spent 6,215 days, or seventeen years, in the wards and cost Philadelphia about $48,000. In a three year period I have Dick tested and immunized 257 children in private practice. Over twenty-five have had known exposure to active scarlet fever with no evidence of infection. Even the mildest case of scarlet fever is often followed by severe renal, cardiac or auditory complications. In a private school epidemic, fifteen boys had scarlet fever. In one of the mildest cases, diagnosed only by throat culture, a severe heart lesion developed and the boy was out of school 127 days. Severe kidney lesions developed in two other supposedly mild cases. A mastoiditis in one necessitated a mastoidectomy; another patient had cervical and mesentery adenitis and later acute appendicitis with an appendectomy. Whether allergic or not, immunization with Dick toxin will prevent clinical scarlet fever with a rash. Quarantine causes a large economic loss, in this private school a loss of 2,000 school days. By preventing clinical scarlet fever one can treat streptococcic infections and allow children to return to school when throat cultures are negative, without prolonged and unnecessary quarantine. However, active immunization probably not only prevents clinical scarlet fever but also the more serious complications of ear, heart and kidney. In the Vineland (N. J.) school for the feebleminded, during an epidemic of scarlet fever, convalescent serum was used but in ten days new cases developed and there was a 60 per cent positive throat culture rate. Active immunization with Dick toxin terminated the epidemic after the third dose. This rapid termination of epidemics has occurred in several other institutions. If patients are given large amounts of orange juice with dextrose before injections of Dick toxin, and several hours rest afterward, reactions will be very few and mild.

DR. C. A. STEWART, Minneapolis: I should like to say in conclusion that statements relative to the immunity produced by pertussis vaccine should be very conservative. Need for an effective vaccine that prevents pertussis and scarlet fever exists and I trust that continued progress in research will develop new immunizing materials superior to those we now have. Relative to tuberculosis may I add that when testing children in private practice I also apply the Mantoux test to parents. This policy yields information relative to the entire family. Studies indicate tentatively that about one household unit in five in Minneapolis is certified without a single positive reaction in the entire unit.

OBSERVATIONS ON THE MODE OF ACTION OF SULFANILAMIDE

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Domagk [1] reported in his original communication on the use of the hydrochloride of 4 sulfamido-2′, 4′ diamino azo-benzene in the treatment of experimental streptococcic infections of mice that phagocytosis of the streptococci by the leukocytes played an important rôle in clearing the tissues of streptococci in the treated mice. Levaditi and Vaisman [2] soon afterward advanced the hypothesis (without much experimental evidence) that this chemical interfered with capsule formation, thus rendering the streptococci susceptible to phagocytosis. The Tréfouëls and their associates [3] made the important observation in 1935 that para-aminobenzenesulfonamide was active as a therapeutic agent in curing mice of experimental streptococcic infections. Fourneau and his collaborators [4] first reported that para-aminobenzenesulfonamide had a bacteriostatic effect on the growth of certain molds.

Colebrook and Kenny [5] stated that the hydrochloride of 4 sulfamido-2′, 4′ diamino azo-benzene and the disodium salt of 4 sulfamido-phenyl-2′-azo-7′-acetylamino-1′-hydroxynapthalene-3′, 6′-disulfonic acid possessed practically no bacteriostatic effects in vitro but that the serums of patients treated with these dyes possessed bacteriostatic qualities against hemolytic streptococci. In our preliminary communications [6] we noted the bacteriostatic effect of sulfanilamide in vitro on hemolytic streptococci and suggested that the therapeutic dye compounds might be activated in vivo by reduction. This explanation was arrived at independently by Colebrook and his associates [7] and by Fuller.[8] Colebrook and his associates [7] further concluded, on the basis of in vitro tests with whole blood and serum, that the blood and serum of patients treated with sulfanilamide showed bactericidal as well as bacteriostatic qualities. Rosenthal [9] reported that sulfanilamide was bactericidal for pneumococci.

In a subsequent report we [10] discounted, on the basis of our observations up to that time, the rôle of bacteriostasis in vivo, and, while concluding that the sulfanilamide must act on the micro-organism and not on the leukocytes, we were unable to explain the origin of the phagocytosis that was evident in the peritoneal exudates of the treated animals.

Recently, Gross and his associates [11] have reported that they are not inclined to believe that the phagocytic activity of the polymorphonuclear leukocytes and monocytes is of importance in controlling experimental streptococcic infections in mice treated with sulfanilamide.

In this present report we shall give experimental observations on the mode of action of sulfanilamide in hemolytic streptococcic and other experimental infections and, in view of new data, we must reinterpret our former observations concerning the rôle of phagocytosis in experimental infections that were treated with sulfanilamide.

METHODS

The following methods were employed in the experimental studies: The cultures of beta hemolytic streptococci used for inoculating mice were twelve to fourteen hour old blood broth cultures from the heart's blood of a mouse which had succumbed to the streptococcic infection. The cultures were incubated at 37 C. Dilutions were always made in beef infusion broth, a different pipet being used for each dilution. Peritoneal exudate was obtained by paracentesis of the mouse's abdomen with sterile glass capillaries. Then films were made of the exudate and these films stained with Wayson's stain and Wright's stain. Capsules were demonstrated by mixing a drop of exudate with a drop of a 2 per cent watery solution of congo red and spreading the mixture with a cigaret paper. The colonial type was determined by inoculating the exudate on the moist surface of freshly prepared chocolate blood-agar plates and incubating the plates for sixteen hours at 37 C. The mouse virulence of the exudate was determined by mixing one drop of the peritoneal exudate with 1 cc. of sterile broth and inoculating the whole amount into the peritoneum of a normal mouse.

EXPERIMENTAL OBSERVATIONS

As has already been stated, there is little evidence that sulfanilamide is bactericidal (in the sense of being an antiseptic) in vitro. In table 1 are the results of numerous tests in which a known number of beta hemolytic streptococci were exposed to 0.1 per cent sulfanilamide concentrations in broth or serum broth at icebox temperatures (± 4 C.) for varying periods of time. The cultures from which the dilutions of the beta hemolytic streptococci were prepared were actively growing twelve to fourteen hour cultures. As will be noted in table 1, there was no evidence that sulfanilamide exerted any bactericidal effect on beta hemolytic streptococci under the conditions that have just been outlined.

Further experiments designed to test the bactericidal effect of sulfanilamide in vitro are shown in table 2. In these experiments the centrifugated sediment from 10 cc. of a twenty-four hour beef infusion broth culture was suspended in Tyrode's solution and the same solution to which 0.1 per cent sulfanilamide had been added. After the bacterial population of these solutions had been determined by blood agar dilution plates, the suspensions were incubated for twenty hours at 37

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This investigation has been supported by a grant from the Chemical Foundation, Inc., of New York.
This article is abbreviated in THE JOURNAL by the omission of the tables. The complete article appears in the authors' reprints.
Read before the Section on Practice of Medicine at the Eighty-Eighth Annual Session of the American Medical Association, Atlantic City, N. J., June 9, 1937.
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C. and the bacterial population of the suspensions were again determined. No evidence was obtained that the death rate of the bacteria suspended in Tyrode's solution was hastened by the addition of sulfanilamide.

Finally, the bactericidal effect of the serums of human beings before and after treatment with sulfanilamide was tested against certain strains of beta hemolytic streptococci in vitro. These tests were performed by inoculating 1 cc. of the various serums with a loopful of a 1:5,000 dilution (in beef infusion broth) of 9 to 14 hour old cultures of beta hemolytic streptococci. After twenty-four and forty-eight hours of incubation at 37 C., 0.25 cc. of each serum was implanted in a poured blood agar plate and after incubation a colonial count was made. In addition, the sulfanilamide content of each serum was determined by the method of Marshall and his associates.[12]

It was noted in the serums taken before treatment that either free growth, partial inhibition of growth or killing took place in certain instances. This was in entire conformity with the recently observed Tillett phenomenon.[13] In the serums containing sulfanilamide, a partial inhibition of growth at the end of twenty-four hours' incubation was the rule, although in certain serums this was not noted. This particular inhibition of growth (bacteriostasis) of hemolytic streptococci in mediums containing sulfanilamide has been previously described by us and was to be expected. After forty-eight hours' incubation at 37 C. the sulfanilamide containing serums showed, as a rule, fewer organisms than did the control serums taken before treatment. This may be evidence of a very feeble antiseptic action of the sulfanilamide or may be due to the exhaustion of the medium. Which of these factors operated in this instance cannot be determined. However, the evidence is clear that the serums of patients treated with sulfanilamide exert little, if any, bactericidal effect on beta hemolytic streptococci in vitro.

In an earlier report we [6a] stated that "phagocytosis of the streptococci by the polymorphonuclear leukocytes plays a paramount rôle in controlling the infection in the early stages of treatment and that later the monocytes join in this phenomenon." All of our subsequent observations have seemed to confirm the belief that in treated mice the streptococci are eradicated by the phagocytes.

We have repeatedly studied this factor, and in tables 4, 5 and 6 examples of the sequence of changes occurring in the peritoneal exudates of treated and untreated mice are portrayed. In the experiments outlined in table 4, treatment was started ten hours after infection had been initiated by the intraperitoneal injection of 1,000 minimum lethal doses of strain C203. Just before therapy was begun, the peritoneal exudates of the infected mice showed little phagocytosis and varying numbers of free hemolytic streptococci. Seven hours later the peritoneal exudates of the treated group showed many streptococci and marked phagocytosis, while the peritoneal exudates of the control mice in three instances showed myriads of streptococci and no phagocytosis. In the other control mice a moderate degree of phagocytosis was present, but in none was it comparable to that in the treated animals. Fourteen hours after treatment had been initiated, five of the six treated mice showed a decrease in the streptococci present in the exudate and an appreciable amount of phagocytosis. By that time all the control mice were dead.

Table 5 shows examples of the changes that occur when the infecting dose is not overwhelming (as in the previous experiment) and when treatment is commenced at an earlier period. Under these conditions phagocytosis again seems to be definitely more accentuated in the treated mice than in the controls. Finally, in table 6 are observations made at frequent intervals on the peritoneal exudates of untreated mice. In each instance an increase in the number of free streptococci was noted as time went on, and, while varying degrees of phagocytosis were observed, it never approached the degree seen in the peritoneal exudates of treated mice.

It is important to note at this point that, beginning about twelve hours after infection, there is a progressive decrease in the number of potential phagocytes in the exudate of the untreated animals due, apparently, to the toxic effects of the infectious process. Often, for a few hours before death, only shadow forms and badly damaged leukocytes can be seen. Hence, in untreated mice there is an absolute as well as a relative decrease in phagocytosis as compared with treated mice.

We were interested in determining, if possible, just what happened to the hemolytic streptococci in the peritoneal exudates of treated mice. Table 7 is an example of the effect of treatment on the colonial type, the mouse virulence, capsules, phagocytosis and rate of multiplication of hemolytic streptococci in the peritoneal exudate of treated mice that had been infected by the intraperitoneal route with 100 minimum lethal doses of C203 eleven hours before the observations and treatment were commenced. As will be noted, there was no change in colonial type, the mouse killing power of a drop of peritoneal exudate remained unimpaired, and capsules persisted as long as the mouse survived. This was also true of untreated control mice. It is interesting that while no free cocci were demonstrable and the cultures were sterile from the exudate of mouse 4 from the thirty-sixth to the ninety-fifth hour, a drop of exudate regularly killed normal mice when injected into the peritoneal cavity. The effects of treatment on the multiplication of the streptococci in vivo and their phagocytosis by the cells in the peritoneal exudate followed the same pattern as has been previously described. No definite conclusions can be drawn from the experiments, but we feel that at least they present evidence that radical changes in certain characteristics of the mouse-virulent streptococcus are not brought about by treatment with sulfanilamide.

Thus, as a result of our observations on the fate of beta hemolytic streptococci in the peritoneal exudates of experimentally infected mice which have been treated with sulfanilamide, we can only state that an increase in phagocytosis and a decrease in the free cocci has been noted. It is impossible to say as yet whether this effect of sulfanilamide is primarily on the hemolytic streptococci or on the phagocytes.

Recently we [14] have noted that sulfanilamide has a curative effect in mice infected with Clostridium welchii. Studies made on the peritoneal exudates of treated and untreated mice have been of great interest. The strain of Clostridium welchii which we used to infect mice killed 90 per cent of untreated mice within a few

12. Marshall, E. K., Jr.; Emerson, Kendall, Jr., and Cutting, W. C.: Para-Aminobenzenesulfonamide, J. A. M. A. **108**: 953 (March 20) 1937.
13. Tillett, W. S.: J. Exper. Med. **65**: 147, 163 (Jan.) 1937.
14. Long, P. H., and Bliss, Eleanor A., to be published.

hours after the injection of the infecting organisms. The inoculum was prepared by centrifugating the supernatant fluid of a twenty-four hour anaerobic beef infusion broth, sterile sand culture and resuspending the centrifugate in an amount of sterile fresh beef infusion broth equal to the original volume of supernatant fluid. (By doing this the immediate effects of the toxin in the whole culture were avoided.) Then 0.5 cc. of this suspension was inoculated by the intraperitoneal route into the test mice.

Studies of the peritoneal exudates of mice infected with Clostridium welchii in this manner show the following points of interest: Phagocytosis of the clostridia begins almost immediately after infection, and as the organisms multiply in the mouse's peritoneal cavity the rate of phagocytosis increases until a stage is reached in which practically all the potential phagocytes are gorged with clostridia. As the toxin produced by Clostridium welchii does not seem to have such a deleterious effect on the mouse's white blood cells as does that produced by the mouse virulent hemolytic streptococcus, the leukocytes are present in goodly numbers in the exudates of untreated animals at the time at which death results from toxemia. A lethal result is obtained when the clostridia multiply more rapidly than they can be removed by the phagocytic cells in the exudate. If the circumstances are reversed, as occurs when a sublethal inoculum of clostridia is used, or if their multiplication rate is decreased in vivo, the mouse survives.

In table 8, an example of the results of frequent observations on the peritoneal exudates of mice infected by the intraperitoneal route with Clostridium welchii is recorded. The treated mice were injected with 1 cc. of a 1 per cent saline solution of sulfanilamide thirty minutes before being infected with Clostridium welchii. Examinations of the peritoneal exudates made fifteen minutes after infection showed approximately the same number of free organisms per oil immersion field in the treated as in the untreated mice. Two hours later the untreated mice showed a definite increase in free bacteria, while the treated mice showed either a decrease or no change in the number of free bacteria per oil immersion field. Phagocytosis was active at this time in both the treated and the untreated mice. The number of ingested bacteria was, however, greater in the untreated mice than in the treated mice. Four hours and fifteen minutes after infection, the number of free bacteria in the exudates of the treated mice had either markedly decreased or remained unchanged, while in the surviving control mice they had definitely increased. Phagocytosis had decreased in the treated mice and remained at a high level in the surviving control mice. The number of ingested bacilli were fewer in the treated mice and increased in the control mice. At six hours and fifteen minutes after infection all three control mice were dead of toxemia, while the treated mice were well on the way to recovery. Twenty-four hours after infection free bacteria were absent from the exudates of the treated mice and a fair percentage of the phagocytic cells still showed ingested bacteria, but the bacteria in the phagocytes were broken up and digested so that no estimate of their number could be made.

The results of these and other similar experiments with Clostridium welchii seem to indicate that as far as this particular organism is concerned sulfanilamide acts primarily by reducing the rate of multiplication of the organisms in the peritoneal cavity of the infected animals. In other words, the chemical has a bacteriostatic action in vivo as well as in vitro.

We have attempted, following the lead of Rich,[15] to determine whether or not the presence of polymorphonuclear leukocytes is a necessary adjunct to sulfanilamide therapy. Forty white mice were treated daily with from 0.05 cc. to 0.1 cc. of benzene mixed with equal parts of olive oil. Total white blood cell and differential counts were made frequently and as soon as their polymorphonuclear count fell below 500 cells per cubic millimeter of blood the mice were infected with 100 minimum lethal doses of virulent hemolytic streptococci (C203). Mice similarly infected, and consisting of a normal mouse, an untreated granulocytopenic mouse, a mouse treated with benzene and sulfanilamide, a mouse treated with benzene and a mouse treated with sulfanilamide, served as controls for each infected granulocytopenic mouse treated with sulfanilamide. The untreated control mice died within thirty-six hours, the untreated granulocytopenic mice within twenty-four hours, the mice treated with benzene within thirty-six hours and the granulocytopenic mice treated with sulfanilamide within seventy-two hours, while the mice treated with sulfanilamide and with benzene and sulfanilamide survived. This experiment seems to indicate that polymorphonuclear leukocytes are necessary in the process that leads to control of infection in mice treated with sulfanilamide.

COMMENT

The mode of action of sulfanilamide has not been clear. Certain observers[16] have noted a definite bacteriostatic (growth inhibitory) effect in vitro against beta hemolytic streptococci and other micro-organisms. Other investigators[17] believe that this chemical has a definite bactericidal (in the sense of antiseptic) influence on beta hemolytic streptococci in vivo and against the pneumococcus in vitro. It has been our experience that sulfanilamide inhibited the growth of susceptible organisms in vitro and that in vivo it brought about a change in the micro-organisms which permitted them to be phagocytized by the white blood cells.

Further experiments reported in this communication do not support the belief that sulfanilamide has a bactericidal (antiseptic) effect in vitro. Its effect in the treatment of experimental streptococcic infections in mice leads us to believe that its action is primarily one of slowing down the rate of multiplication of the streptococci, thus permitting the phagocytes to dispose of them before they exert a lethal effect on the mouse. We could not demonstrate that the hemolytic streptococci isolated from the peritoneal exudates of treated infected mice were altered in such characteristics as the type of colonial formation, their virulence for mice or the presence of capsular material. In these respects they were identical with those streptococci isolated from untreated control mice. There seemed to be little evidence that, in vivo, the chemical exerted a bactericidal effect. Thus, while it is our belief that the decrease in the number of free hemolytic streptococci in the exudates represented a bacteriostatic and phagocytic effect, it could be argued that sulfanilamide either protects the phagocytes from the noxious effects of the streptococcic infection or actually stimulates them to increased phagocytosis. The latter possibility could

15. Rich, A. R.: Bull. Johns Hopkins Hosp. **52**: 203 (March) 1933.
16. Fourneau, Tréfouël, Tréfouël, Nitti and Bovet.[4] Long and Bliss.[6] Colebrook, Buttle and O'Meara.[7]
17. Colebrook, Buttle and O'Meara.[7] Rosenthal.[9]

not be ruled out on the basis of the facts observed in mice infected with hemolytic streptococci.

Our studies, however, on the effects of sulfanilamide therapy in experimental peritonitis in mice caused by the Welch bacillus have permitted us to form a definite opinion on the question of whether or not the chemical acts on the bacterium or through the agency of the leukocytes.

In experimental Welch bacillus peritonitis in mice, death quickly occurs in untreated mice from an overwhelming toxemia. The organism itself is not resistant to phagocytosis, and from the beginning of the infection the phagocytes are filled with ingested bacteria. However, when a lethal dose is injected, the leukocytes, although extraordinarily active in phagocytosis, cannot ingest enough bacteria to keep pace with the multiplication of, and toxin formation by, the organisms, and in a short time the mouse succumbs. There is no evidence up to the time of death that phagocytosis is either absolutely or relatively decreased in the untreated mice.

Treatment with sulfanilamide definitely altered this sequence of events. From the beginning of treatment a decrease in the bacilli free in the peritoneal exudate was noted. Phagocytosis was marked, but the total number of ingested bacteria in the treated mice was less than in the control mice. Successive observations over a period of a few hours showed a progressive decrease in the number of free and ingested bacteria in the peritoneal exudates. Since the only essential difference between the untreated and the treated mice was in the number of bacteria free in the exudates at the various periods of observation, we feel that the only interpretation that can be placed on the observed facts is that sulfanilamide inhibited the growth of the bacteria in vivo. We had previously shown [14] that sulfanilamide has a bacteriostatic effect on Clostridium welchii in vitro and now have noted its bacteriostatic effect in vivo.

We realize that it is dangerous to reason by analogy, but it seems logical to believe that the action of sulfanilamide is the same on all susceptible bacteria. Granting this, the recorded observations in experimental streptococcic peritonitis in mice can now be interpreted as being evidence of bacteriostasis rather than of a direct protective or stimulative action on the phagocytes. Thus, in this type of infection the effect of sulfanilamide therapy is to cut down the rate of multiplication of the streptococci to a point at which they no longer produce enough "leukocidin" and other toxic products to inhibit rapid phagocytosis. This effect permits the phagocytes to clear the exudates and tissues of organisms, and recovery from the infection results. That the leukocytes are required in this process is evidenced by the observation that mice in which the polymorphonuclear leukocytes have been depressed by injection of benzene below 500 cells per cubic millimeter of blood succumb to experimental streptococcic infection despite adequate treatment with sulfanilamide.

CONCLUSION

Experimental evidence shows that bacteriostasis is the only demonstrable factor in the process which leads to the control of Clostridium welchii infection in mice treated with sulfanilamide.

Observations made by us in experimental streptococcic infections in mice treated with sulfanilamide also could be interpreted as evidence that bacteriostasis plays a rôle in the control of this type of infection.

ABSTRACT OF DISCUSSION

DR. CHESTER S. KEEFER, Boston: The authors have recorded the information that exists at the present time regarding the use of sulfanilamide in various infections, with particular reference to hemolytic streptococcus, meningococcic and gonococcic infections. My experience is in complete accord with what they have stated. Dr. Helmholz recorded his experience with the use of this drug in the treatment of infections of the urinary tract. He pointed out that when the drug was given by mouth it was actively bactericidal for the colon bacillus but had no effect on Streptococcus faecalis. I have had an opportunity of studying ten patients with hemolytic streptococcus infections with bacteremia. In such a group of individuals one expects that the case fatality rate will be high. Of these ten patients, only two died. One patient was under observation only twenty-four hours and received only 8 Gm. of the drug, so that one can say that in this instance, at least, there was not a sufficiently long period of observation to form the basis for drawing any definite conclusions. The second patient had a thrombophlebitis of the right jugular vein, and the treatment was ineffective. Our experience with meningococcic infections likewise has been very encouraging, as reported by Dr. Schwentker and his associates. I have been interested in studying the effect of this drug in gonococcic infections of the joints. When this drug is added to whole blood or plasma it becomes actively bactericidal for the gonococcus. If the drug is administered by mouth, one can also render the whole blood or blood plasma bactericidal for the gonococcus. I have had an opportunity to observe several patients with gonococcic arthritis in whom it was possible to sterilize the synovial fluid within two days after the oral administration of the drug. So there is suggestive evidence, at least, that the use of this drug in the treatment of gonococcic arthritis may be effective, particularly for those patients who have an infected fluid. I have not observed any serious toxic effects following the administration of this compound. I believe, as the authors have stated, that the drug is relatively nontoxic, but it should be given with careful supervision. The blood count should be followed daily, and one should see that the patient receives adequate nursing care and an adequate amount of fluid.

DR. FRANCIS F. SCHWENTKER, Baltimore: My associates and I have used sulfanilamide in the treatment of 180 patients. Of these, 115 were suffering with some type of infection due to the beta hemolytic streptococcus and fifty-two had meningococcic meningitis. The mortality among patients with meningococcic infections treated with sulfanilamide alone was 15 per cent. This might be compared with a mortality of 30 per cent among patients treated with antiserum during the same epidemic in the same hospital. With only fifty-two cases it is not safe to conclude more than that sulfanilamide seems as effective in the treatment of meningococcic infection as is antiserum and has the advantage of freedom from foreign protein effects. Fifty-three patients with scarlet fever treated with sulfanilamide during the acute stage of illness showed no appreciable acceleration in the rate of recovery. Our results in twenty-seven cases of erysipelas have been excellent. It cannot be emphasized too strongly that although sulfanilamide is relatively nontoxic there are certain definite toxic effects which may develop with which every physician who uses the drug should be familiar. It is dangerous to use sulfanilamide promiscuously.

DR. JOHN H. MUSSER, New Orleans: As chairman I think I should caution members of the section to be on the lookout for possible ill effects from a drug which has received such tremendous free publicity in the lay press. Among other things it has been announced that the drug will cure gonorrhea in four days. Be assured that every drugstore in the country is going to dispense it to their patients with gonorrhea. I should like to ask the authors two questions: (1) with regard to the use of sulfanilamide in erysipelas, which I have tried without obtaining very much effect; (2) as to its immediate effect on streptococcic sore throat.

DR. PERRIN H. LONG, Baltimore: With regard to Dr. Musser's question on the use of sulfanilamide in erysipelas, we have found that the drug has been highly effective. We have had

about fifty cases, and in every instance the lesion has stopped spreading within sixteen hours after the administration of sulfanilamide. Of course, we feel that if one wants to get marked clinical effects one must give the large doses, which we have been giving in Baltimore. With regard to streptococcic sore throat, all I can say is that it seems to be effective. It is very difficult, of course, to set up statistical studies regarding the effect of any drug on streptococcic sore throat. However, in cases that have gone on to a definite peritonsillar involvement, we have noted that sometimes the swelling and edema disappear with startling rapidity when adequate amounts of sulfanilamide have been given. I want to conclude by begging that care be taken in the use of sulfanilamide. Otherwise the administration of sulfanilamide is going to result in many cases of hemolytic anemia and agranulocytosis with fatalities.

THE VALUE OF NEPHROSTOMY AND DECAPSULATION IN ANURIA

GEORGE R. LIVERMORE, M.D.
MEMPHIS, TENN.

In a paper read before the American Association of Genito-Urinary Surgeons in May 1933 I stressed the value of nephrostomy in anuria and reported four cases in which I was successful both in establishing diuresis and in saving life. I also reported a case of anuria due to poisoning with mercury bichloride from Dr. W. H. McNeill's service at Bellevue Hospital in New York City in which the treatment had the same happy result. I now wish to present another successful result, in a case of anuria due to poisoning with saponated solution of cresol.

In 1914 I [1] reported a surgical treatment for anuria which consisted of decapsulation, nephrotomy and packing the pelvis through the nephrostomy wound with gauze saturated with 10 per cent ichthammol in glycerin. I now feel that the pack adds nothing that cannot be accomplished by the nephrostomy tube and decapsulation. Having recently used the method in a case of anuria resulting from poisoning with saponated solution of cresol, with complete relief and restoration to health, I think it is of sufficient interest to report in detail.

Cabot, Boyd and I, among others, have reported favorable results from nephrostomy, but I feel that it is such a valuable and life-saving procedure that repetition and reports of cases may bring it to the attention of some members of the profession who are unaware of the great good that it may accomplish. Cases in which it is of especial value are those in which a desperate condition prevails, e. g., anuria following poisoning with phenol or mercury, acute obstruction with sepsis that it would be too hazardous, or very difficult, to relieve by operation, and calculous anuria, especially in patients with only one kidney who are not relieved by drainage with a catheter. In order, therefore, to obtain the best results, it is essential that nephrostomy be done as quickly as possible with paravertebral block supplemented by as little cyclopropane anesthesia as possible.

TECHNIC

The kidney is freed as rapidly as is compatible with safety and good surgical procedure, an incision made 1 cm. posterior to the convex border of the kidney and the finger passed through it into the pelvis. A 33 to 35 F. catheter is then placed in the pelvis through the nephrotomy wound and sutured to the parenchyma with No. 2 plain catgut. The catheter should have an opening in the tip and one on each side just above the tip. The kidney is then replaced and the tube is anchored to the skin with silkworm gut. In cases in which the kidney cannot be freed the nephrotomy wound may be made near the convex border or on the post surface of the kidney.

Cabot's method of making an opening in the pelvis of the kidney and passing a U-shaped sound into this opening and out through the convex border at a point that drains the lower calix is excellent. I believe, however, that the location of the tube makes little difference if the end with two eyes is placed in the pelvis, because it is the relief of tension due to removal of the capsule and the nephrostomy wound that enables the kidney tubules to function. It is a fact too that, when the ureter is patent, at least as much urine will pass down the ureter to the bladder as is carried off by the tube in the kidney. I have not found it necessary to use a winged or Pezzer catheter and rather hesitate to do so on account of the difficulty of removal.

It is remarkable how well patients progress after bilateral nephrostomy, and they seem to suffer no more than when subjected to a single kidney operation.

Chace and Myers [2] stated that a patient with 5 mg. of creatinine per hundred cubic centimeters of blood never recovers. In the case here reported the patient had a creatinine content of 7 mg. and practically complete anuria, and nephrostomy and decapsulation were not done till the eighth day following poisoning. As he made a complete recovery, I think the case is worthy of report.

M. L., a white man aged 22, was tall, slender, neurotic and an introvert. He was an only child, pampered and spoiled by the mother. The father had no voice in his management. He had the usual diseases of childhood and typhoid fever when he was 15.

March 24, 1936, at 11 p. m., while on a spree, the patient drank 2½ ounces (75 cc.) of saponated solution of cresol in a high-ball. He was taken by ambulance to the hospital, where he was seen in the emergency room by his family physician. He was unconscious, cyanotic and in profound shock. Cardiac stimulants were given and his stomach was lavaged with sodium bicarbonate solution, 1 drachm (4 cc.) to the pint, to which about 2 ounces (60 cc.) of alcohol was added. One-half ounce of alcohol in 1 ounce of water was left in the stomach after the lavage. When the patient reached his room his temperature was 100.2 F., pulse rate 140 and respiratory rate 14. Epinephrine, atropine, caffeine, sodium benzoate and digifoline were given at intervals during the night. An air way was introduced and carbon dioxide administered frequently for cyanosis and dyspnea. The patient regained consciousness at 5:30 the next morning, and, although his mouth and pharynx were severely burned, he drank water and orange juice and ate crushed ice during the day. He vomited many times, and at 9:30 a. m. he voided 12 ounces of dark brown urine and at 1 p. m. 10 ounces more. The urine was acid and cloudy, had a specific gravity of 1.013, showed a 1 plus reaction for albumin, and had from 2 to 4 hyaline casts to each high power field, a rare pus cell and no blood cells. By 3 p. m. the patient's mouth and pharynx were so sore and swollen that deglutition became very difficult. There was no urinary output during the night and the following day, but at 1 a. m. on May 27 he voided 4 ounces. May 28 he voided 2 ounces of very dark brown urine. May 29, at 9 p. m., 1 ounce of urine was obtained by catheter. May 30 he voided less than 1 ounce; May 31, 1½ ounces, and June 1, three-fourths ounce.

Read before the Section on Urology at the Eighty-Eighth Annual Session of the American Medical Association, Atlantic City, N. J., June 11, 1937.

1. Livermore, George R.: South. M. J. 7: 322, 1914.

2. Chace, A. F., and Myers, V. C.: The Value of Recent Laboratory Tests in the Diagnosis and Treatment of Nephritis, J. A. M. A. 67: 929 (Sept. 23) 1916.

I was called to see the patient at 2:30 p. m. June 1 and ordered 1,000 cc. of Fischer's solution to be given intravenously every eight hours, 15 grains (1 Gm.) of theobromine with sodium salicylate every three hours and 250 cc. of dextrose and soda solution by rectum every six hours. The urine was dark brown, had a specific gravity of 1,024, showed a 4 plus reaction for albumin and contained innumerable pus and blood cells and hyaline and both fine and coarse granular casts. The nonprotein nitrogen content of the blood was 200 mg. and the creatinine content 6 mg. per hundred cubic centimeters. The blood pressure was 170 systolic and 80 diastolic. As there was no improvement after the treatment described, I advised nephrostomy and decapsulation, but consent was not obtained till the morning of June 2.

The operation consisted of bilateral decapsulation and nephrostomy. A half inch incision was made through the cortex to the pelvis of each kidney. A 22 F. catheter was placed in each pelvis and sutured to the cortex with plain No. 1 catgut and to the skin with silkworm gut. The nephrostomy wound was closed to the catheter with No. 1 catgut, a piece of fat being placed in the kidney wound to control hemorrhage. A cigaret drain was applied to each nephrostomy wound and the incisions closed to the catheters and drains, the muscles and fascia with chromic gut No. 2 and the skin with silkworm gut. Both operations were completed in one hour. Five per cent dextrose in saline solution, 1,000 cc., was given intravenously on the operating table and 1,000 cc. of Fischer's solution twelve hours later, and one of the solutions was given every twelve hours thereafter for four days and then once daily till the tenth day. One cc. of U 20 insulin was given daily for 4 days and then 0.5 cc. till the administration of dextrose was discontinued. The blood sugar content was never found to be above 125 mg. per hundred cubic centimeters. Proctoclysis with 250 cc. of dextrose and soda solution was done every six hours during the first day.

The Blood Picture After Operation

Date (June)	Day After Operation	Nonprotein Nitrogen, Mg. per 100 Cc.	Creatinine, Mg. per 100 Cc.	Blood Pressure	
				Systolic	Diastolic
2	.....	.....	...	172	28
3	1st	233.0	7.0	...	..
4	2d	181.5	7.0	...	..
5	3d	175.0	5.0	220	60
6	4th	150.0	4.5	220	60
7	5th	143.0	4.4	176	60
8	.....	.....	...	166	80
9	.....	.....	...	176	90
11	9th	90.0	3.7	150	80
14	.....	.....	...	142	84
15	13th	75.0	2.7	130	70
25	23d	28.0	2.0	134	70

In the first twenty-four hours after operation the urinary output was 742 cc., in the second twenty-four hours, 2,130 cc., in the third twenty-four hours, 2,760 cc. and in the fourth twenty-four hours, 4,000 cc.

June 5 a blood count showed red cells 3,390,000 and hemoglobin 70 per cent; therefore, 500 cc. blood was given by the citrate method and 90 cc. of citrate used instead of 60. June 11 the count showed red cells 3,192,000 and hemoglobin 62 per cent, so another transfusion of 500 cc. of citrated blood was given.

On the day of operation, June 2, the nonprotein nitrogen content of the blood was 200 mg. per hundred cubic centimeters and the creatinine content 6 mg. Subsequent values are shown in the accompanying table.

The temperature varied from 102 to 99.4 F. from the operation to June 21. It then fell to normal and remained so. The pulse rate was between 140 and 110 until June 16 and then 90, where it remained till July 15, when it was 78.

On the fourth day after operation the patient had a severe convulsion lasting two minutes and two more within the next thirty minutes. Morphine one-fourth grain (0.016 Gm.) failed to control, so chloroform was given, with good effect, and the administration of morphine repeated. The patient was put in a mustard bath and then wrapped in warm blankets, and good diaphoresis was established. No more convulsions occurred.

The patient continued to improve each day, as shown by his general condition, the blood picture and the urinary output. The urine gradually improved until, on July 20, it was free from albumin, casts and blood and contained only a rare pus cell. The nephrostomy tubes were removed on the fourteenth day after operation, and the wounds were completely healed July 20.

The patient has been working daily for nine months as a clerk in a large wholesale hardware store, has not touched any liquor since the night he entered the hospital, and says he never was in better health than he is at the present time.

Medical Arts Building.

ABSTRACT OF DISCUSSION

DR. NELSE F. OCKERBLAD, Kansas City, Mo.: The idea of decapsulation came about perhaps fifty years ago, as a result of theoretical considerations: One was to liberate the kidney from the pressure within the capsule, and the other was to try to get new blood supply to the kidney. Edebohls popularized this method and it had a great vogue for a time and there have been waves of revival of decapsulation from time to time. Just how many of those operated on would recover anyway is a problem of which one is not sure. I think Dr. Livermore should be commended on the report of this case and the excellent results obtained. If enough of these cases can be reviewed, I believe that some valuable conclusions could be drawn on this subject.

DR. A. I. DODSON, Richmond, Va.: I want to say a word in commending this method of treatment. I have had an opportunity to use it in cases of calculous anuria and in acute fulminating conditions of the kidney in which only one kidney was drained. I feel it is important that Dr. Livermore's paper be brought to the attention of internists and men in general practice. In my own service I have on a number of occasions advised and requested the opportunity to do nephrostomy and decapsulation in cases of poisoning in different types of anuria, without the consent of either the family or, most frequently, the doctors who are managing the case. It has been my experience that the internists in my section of the country have little faith in it and fear to submit their patients to such procedure.

DR. GEORGE R. LIVERMORE, Memphis, Tenn.: I think it is an operation that is particularly valuable in certain types of cases. One cannot expect to cure all the cases of poisoning by mercury bichloride and saponated solution of cresol, because the kidney is not the only organ that is damaged. Both the gastro-intestinal tract and the liver come in for a large share of damage and though kidney function is established the patient often dies from other complications. Some years ago Sanford of Cleveland reported two cases of mercury bichloride poisoning successfully treated by this method. It is remarkable that when a nephrostomy and decapsulation are done when the patient has been anuric for some time, oftentimes the tube will begin to drip urine even before the patient has returned to his room. I could cite numerous cases in which it has been a life saver in my practice. One patient having bilateral kidney stones and complete anuria from a stone in the right ureter drained 2,000 cc. of urine in twenty-four hours following this operation, and later I removed the stones from the ureter and both kidneys. Another patient with one kidney came back with complete anuria due to a stricture of the ureter. A catheter could not be passed beyond the stricture in the ureter, but drainage was established through nephrostomy and decapsulation. This patient is alive and well today, nine years after her operation, and is still wearing her nephrostomy tube. In such cases the condition of the patient is critical, and most of them will die unless operated on; but if one does a nephrostomy one at least gives them a chance to establish drainage, which if successful will often bring about happy results.

Healers and Emotional Strain.—It is well known by every intelligent person today, layman as well as physician, that many ailments are caused or modified by emotional strain, and many forms of treatment by various sorts of healers are successfully practiced on the basis of this knowledge.—Robinson, G. Canby: The Relation of Emotional Strain to Illness, *Ann. Int. Med.* **11**:345 (Aug.) 1937.

Clinical Notes, Suggestions and New Instruments

REMOVAL OF POWDER TATTOO BY MINOR SURGERY

H. C. L. Lindsay, M.D., Pasadena, Calif.

Methods of removing gun powder are fairly efficient; it is vastly more difficult to free the skin from powder stains or tattoo marks.

The first complete success in the treatment of such a case that I witnessed was carried out on myself by Capt. James M. Taylor, R.A.M.C. I received a black powder blast in the face. The shot was fired at close range and thus the powder penetrated the tissues to considerable depths in various places.

The removal of the powder grains commenced the same day and proceeded, with the exception of rest periods, for three days. Antiseptic compresses were applied at night, and the following day the work of removal of powder was renewed. Serum accumulated around individual grains of powder. These were difficult to remove the first day, but the serum seemed to facilitate their removal the following days. Inside of three days every grain of powder had been eradicated from the skin and within two weeks no signs of disfigurement were visible.

Dr. Taylor used a Hagedorn needle, firmly held in a small needle holder, for prying out the powder or scraping out any stain. He kept the part moist during the operation with pure alcohol. This antiseptic did not obscure his field and he used hydrogen peroxide or pressure to stop any undue hemorrhage and oozing of serum from minute cuts.

Until recently this technic for removal of powder grains and stains had proved a satisfactory procedure. However, the newer powders are finer grained and have higher explosive coefficients than formerly. They actually penetrate deeper into the skin and leave more tattoo marks. Not infrequently the powder particles, dust or stain are driven right into the underlying muscles. It is necessary to go deeper for these pieces, which show through the skin even though they do go deep.

No very great difficulty is experienced in removing these deeper particles of stain or powder if a Bard-Parker cataract

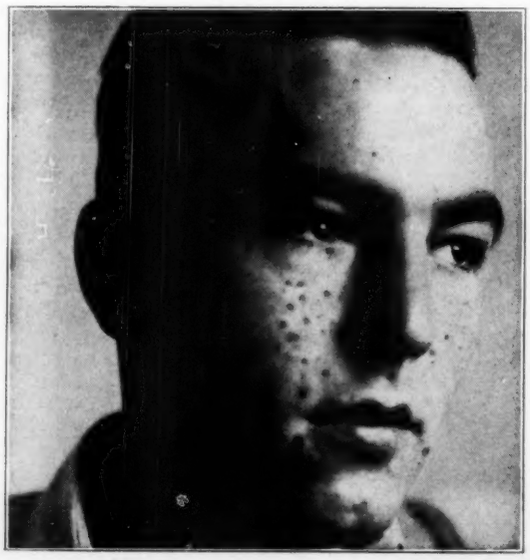


Fig. 1.—Disfiguring powder stains in the skin of the face before their removal by minor surgery.

knife is used for cutting them out. The smallest size splinter forceps is useful in removing loosened specks. Thus, having selected a small tattoo spot to be removed, the operator renders the area as aseptic as possible and puts tension on the skin with one hand while he cuts carefully around the tattooed powder spot to a depth slightly deeper than the powder stain has penetrated. The blade must be new and keen. When two thirds of the circle has been completed it is advisable to seize this portion within the area of the horseshoe-like cut by means of the fine splinter forceps to steady it, while the cutting of the far side of the area and the underneath is completed. Even with a sharp knife, one must allow for some give to the tissue, and on this account a slightly wider cut is made. Otherwise minute specks are apt to be missed on this far edge.

It is a good plan to remove all the powder grains at first and the stains at subsequent sittings. Most large areas can be divided up into numerous smaller areas, each bound by healthy unaffected skin. Removal of areas of tissue or skin

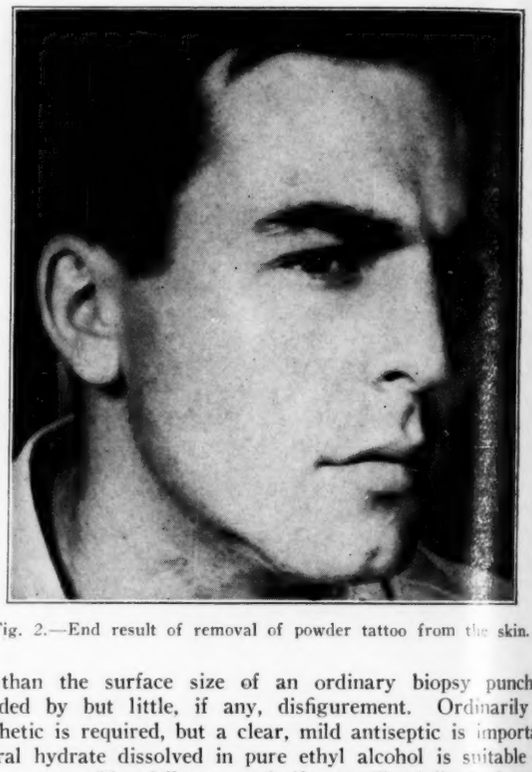


Fig. 2.—End result of removal of powder tattoo from the skin.

less than the surface size of an ordinary biopsy punch is attended by but little, if any, disfigurement. Ordinarily no anesthetic is required, but a clear, mild antiseptic is important. Chloral hydrate dissolved in pure ethyl alcohol is suitable for this purpose. The delicate eye knife speedily dulls during use, and it is necessary to change blades often in order to do good work and especially to prevent pain.

It is seldom, indeed, that a suture is required to close a wound. The finest linen is most satisfactory for sewing the skin when necessary but should be removed within three days. Fish-line adhesive strips are of value to hold parts together; very thin strips of adhesive plaster such as will retain parts in position and still allow exudation to take place between strips may be used.

The after-dressing is simple. The parts are covered with bismuth formic iodide powder and then covered lightly with gauze, held in place by adhesive plaster if the lesions are on the body. If only the face is involved, I prefer to cover the area with an antiseptic powder and leave it exposed to the air as much as possible. However, exigencies make this impracticable sometimes, more especially in ambulatory cases, in which predicament I use the same technic as mentioned for the body.

REPORT OF CASE

M. B., a youth aged 20, single, an American college student, had had excellent general health with the exception that there was a scar on his neck from the removal of tuberculous glands in his early youth. During experiments with an especially finely pulverized high explosive gun powder, the cannon used for the experiments was demolished by an explosion. Powder grains and stains were blown into the patient's face, eyelids, nose, lips, tongue, ears and chest but none into the eyes. The powder grains were mostly removed by surgeons and the patient was referred to me for removal of the powder stains. This was accomplished by the technic described. The explosion occurred Feb. 14, 1935, and the last of the stains was removed by April 14, 1935.

509 First Trust Building.

Special Article from the American Medical Association Chemical Laboratory

THE FOLLOWING REPORTS ON THE CHEMICAL AND PHARMACOLOGIC EXAMINATIONS OF ELIXIR OF SULFANILAMIDE-MASSENGILL ARE ISSUED UNDER THE AUSPICES OF THE A. M. A. CHEMICAL LABORATORY. IN ADDITION THERE ARE INCLUDED REPORTS OF CERTAIN NECROPSIES AND A SUMMARY OF REPORTED DEATHS UP TO AND INCLUDING FRIDAY, OCTOBER 29.

PAUL NICHOLAS LEECH, DIRECTOR,
A. M. A. CHEMICAL LABORATORY.

ELIXIR OF SULFANILAMIDE-MASSENGILL

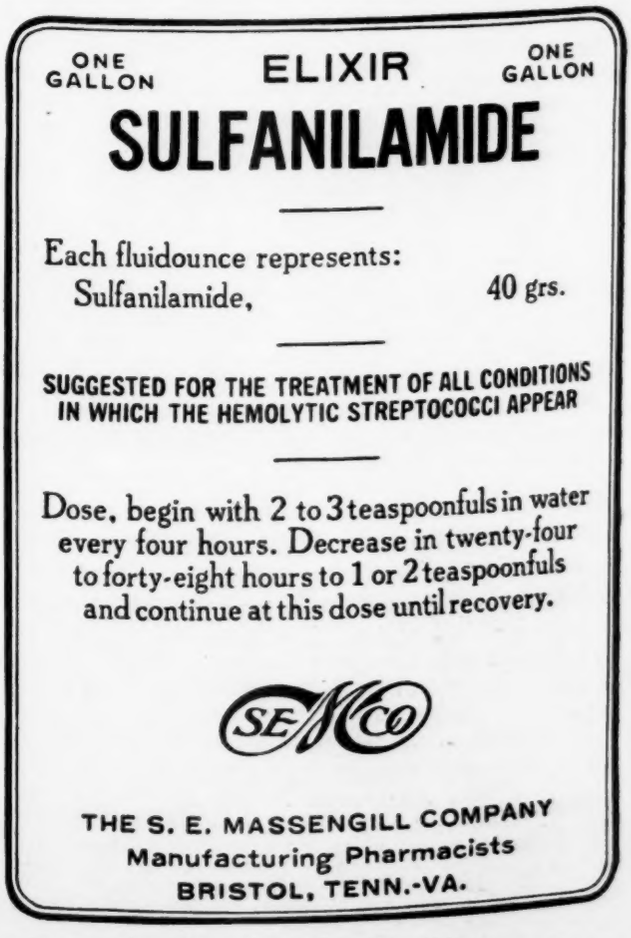
CHEMICAL, PHARMACOLOGIC, PATHOLOGIC AND NECROPSY REPORTS; PRELIMINARY TOXICITY REPORTS ON DIETHYLENE GLYCOL AND SULFANILAMIDE

I

INTRODUCTION

On Monday, October 11, telegrams were received from Dr. James Stevenson, president of the Tulsa County Medical Society, and from the Springer Clinic of Tulsa, stating that six deaths had occurred following the administration of Elixir of Sulfanilamide-Massengill, all cases having in common the pathologic condition of complete anuria. The telegrams inquired concerning the composition of the Elixir of Sulfanilamide-Massengill. In response, information was telegraphed that no product of the S. E. Massengill Company stands accepted by the Council on Pharmacy and Chemistry and that the Council had recognized no solution of sulfanilamide. The reason for the latter statement is that the Council is not in position to accept a solution of sulfanilamide until there is adequate evidence that it is both stable and does not contain toxic material in the doses recommended. The A. M. A. Chemical Laboratory immediately sent for specimens of Elixir of Sulfanilamide-Massengill. Two specimens were received from Tulsa, Okla., of the same solution which, it was stated, had been given to patients. A telegram was sent to the S. E. Massengill Company asking for the composition of the product. The firm gave the composition with the request that it be accepted confidentially. With this clue the Laboratory immediately tested the first preparation that was received. Information was telegraphed to Dr. H. A. Ruprecht of the Springer Clinic of Tulsa, suggesting the presence of diethylene glycol as the causative factor, the presence of which was confirmed by the Laboratory in the specimens examined. Original specimens were also obtained on the open market in Tulsa and a gallon of the elixir was ordered from the manufacturer. This was shipped promptly. Preliminary animal experiments were also made which indicated diethylene glycol as the toxic agent. A report of deaths in East St. Louis, Ill., was obtained from Dr. O. E. Hagebusch, pathologist at St. Louis. The composition of several specimens of Elixir of Sulfanilamide-Massengill appeared to be the same; the number of deaths in Tulsa had increased and reports from St. Louis of additional deaths indicated that the episode was not simply one of local character. The editor of THE JOURNAL then released a general warning to the public through the daily papers and over the radio. This warning was issued Monday, October 18, based on the editorial which appeared in the October 23 issue of THE JOURNAL, at the earliest possible moment after the facts were established.

Since then the headquarters group of the American Medical Association has had much assistance and cooperation from Dr. E. M. K. Geiling and Dr. Paul R. Cannon of the University of Chicago, and Dr. J. Howard Brown, Dr. Perrin Long and Dr. E. K. Marshall Jr. of the Johns Hopkins University, from Mr. W. G. Campbell, chief of the U. S. Food and Drug Administration, and from Mr. J. O. Clarke, chief of the central division of the U. S. Food and Drug Administration. By close cooperation between the government and the American Medical Association, reports of deaths were immediately checked by both agencies. Furthermore, the government traced every shipment of Elixir of Sulfanilamide-Massengill.


ONE GALLON
ELIXIR
ONE GALLON
SULFANILAMIDE
Each fluidounce represents:
Sulfanilamide, 40 grs.
SUGGESTED FOR THE TREATMENT OF ALL CONDITIONS IN WHICH THE HEMOLYTIC STREPTOCOCCI APPEAR
Dose, begin with 2 to 3 teaspoonfuls in water every four hours. Decrease in twenty-four to forty-eight hours to 1 or 2 teaspoonfuls and continue at this dose until recovery.
SE Co
THE S. E. MASSENGILL COMPANY
Manufacturing Pharmacists
BRISTOL, TENN.-VA.

Label of gallon bottle of Elixir of Sulfanilamide-Massengill. The presence of diethylene glycol was not declared on the label. The dosage recommended should be noted, particularly the last statement "and continue at this dose until recovery." This phrase is tragically ironical in view of the number of deaths reported.

Wherever any material had been dispensed from a bottle, efforts were made to find out to whom it had been administered and to give adequate warning in case the patients were still alive. Acknowledgment is also made to Dr. H. A. Ruprecht and Dr. I. A. Nelson of the Springer Clinic, Tulsa, who furnished the first complete statement of the postmortem examinations, to Dr. Darwin B. Childs of the Childs Clinic, Tulsa, who forwarded to the A. M. A. Laboratory specimens of the Elixir of Sulfanilamide originally dispensed, and to Dr. O. E. Hagebusch of St. Louis for forwarding his results.

II

CHEMICAL EXAMINATION OF ELIXIR OF SULFANILAMIDE-MASSENGILL

E. W. SCHOEFFEL, PH.D.
H. R. KREIDER, PH.D.
AND
J. B. PETERSON, PH.D.
CHICAGO

A bottle stated to contain Elixir of Sulfanilamide-Massengill, shipped by Dr. Darwin B. Childs of Tulsa, Okla., was submitted to the A. M. A. Chemical Laboratory for examination. The bottle bore the name of the Quaker Drug Company, Rexall Drug Stores of Tulsa.

The bottle contained approximately 50 cc. of a reddish, somewhat viscous liquid, having an aromatic odor resembling raspberry and anise, a sweet taste, and resembling glycerin in general physical character. The specific gravity of the substance was 1.1247 at 23 C. The surface tension was 53.8 dynes per centimeter and the index of refraction was 1.442 at 23 C.[1] A portion of the material was subjected to high vacuum distillation 10^{-6} mm. (distillation range 70-95 C.) most of the distillate coming over at 75 C. After removal of water, the distillate amounted to approximately 72 per cent by volume of a clear, viscous liquid having an index of refraction, surface tension and boiling point the same as that for a known specimen of pure diethylene glycol (purchased on the open market). The residue was found to consist of sulfanilamide, with small amounts of soluble saccharin, and coloring material such as amaranth or similar dye. The odor resembled anise and raspberry. A trace of alcohol was indicated. The residue when examined by microchemical means was found to consist essentially of sulfanilamide.[2] When the latter was subjected to fractionation and tested by means of the Kofler microchemical melting point apparatus, the fractions were all found to give essentially the same melting point, showing that the sulfanilamide had not decomposed in this solution.

Spectrographic examination failed to reveal the presence of such poisonous substances as lead, bismuth, mercury and arsenic. Quantitative examinations yielded the following:

	By Volume
Diethylene glycol (approximately)	72 per cent[3]
Sulfanilamide (approximately)	10 per cent Weight/Volume
Water (approximately)	15.6 per cent

Chemical examinations were also made on material from the original bottles from Tulsa and on material from a gallon bottle sent by the manufacturer. The resultant figures based on these determinations corresponded closely with the figures given above.

ANALYTICAL PROCEDURE

A measured amount is subjected to high vacuum distillation between 10^{-6} or 10^{-7} mm. of mercury using a fractionation attachment and an all glass ground joint apparatus. The outside bath should not exceed 130 C. The boiling of the liquid begins at room temperature (25) suggesting a small amount of low boiling material. With the rise of the inside thermometer to 30 C. the receiver is changed. It contains some of the aromatic flavor substances (probably esters, ethanol, etc.). Between 30 and 65 C. most of the water comes over into the CO_2-acetone cooled receiver. With the use of a Tesla coil the end of the distillation of the water is followed up. As soon as the bright bluish discharge of the hydrogen color disappears the receiver is changed again (temperature of the distillation flask between 45 and 65 C.). The thermometer now goes up rapidly to 95 and comes back to 75 C. Again the receiver is changed. At 75 the liquid comes over at a moderate rate. From now on until the end the receiver is changed two times more following the drop in the rate of flow. The distillation is interrupted and the complete dry material is dissolved in as little boiling water as possible. On cooling, crystallization sets in. The crystalline mass is triturated with a small amount of ice water and sucked dry on an outside ice packed Buchner funnel. The mother liquid gives on evaporation a second yield of crystals. The dry crystalline material containing some of the dye and saccharin is successively extracted with absolute peroxide free ether in a continuous extractor followed by dry absolute amyl alcohol, which dissolves the sulfanilamide. The mother liquors of the fractions are evaporated and again recrystallized. All the crystalline fractions are subjected to melting point determinations to check the purity of the sulfanilamide. No decomposition products were obtained at the end of this preliminary report. Further work is in progress.

Conclusions.—From the foregoing examination it appears that Elixir of Sulfanilamide-Massengill is essentially a mixture containing approximately 9 to 10 Gm. of sulfanilamide dissolved in 100 cc. of a solution consisting of diethylene glycol 72 per cent by volume and water 15.6 per cent by volume, to which had been added a small amount of soluble saccharin, coloring such as amaranth or similar dye, flavoring resembling raspberry and anise, with an extremely small amount of reducing substances. This is in close agreement to the statements of the manufacturer that elixir of sulfanilamide contains 40 grains of sulfanilamide in one ounce of fluid and that the diethylene glycol approaches 75 per cent of the volume.

"SYNTHETIC" ELIXIR

A synthetic preparation was also prepared for the purpose of pharmacologic investigation (this is the material referred to in the reports of Dr. E. M. K. Geiling and Dr. Paul R. Cannon which follow). The synthetic preparation consisted of diethylene glycol 75 per cent by volume, sulfanilamide 10 per cent weight/volume, 0.2 per cent soluble saccharin, and 0.2 per cent cochineal, and water to make 100 cc. This product was compared by means of the refractive index and surface tension and specific gravity with (*a*) the specimen reported on in the foregoing paragraph, (*b*) the contents of an original pint bottle of Elixir of Sulfanilamide-Massengill and (*c*) the Elixir of Sulfanilamide-Massengill received directly from the manufacturer. The determinations on the index of refraction, specific gravity and surface tension of the several mixtures indicated that they were similar.

III

PRELIMINARY REPORT OF TOXICITY STUDIES ON RATS, RABBITS AND DOGS

FOLLOWING INGESTION IN DIVIDED DOSES OF DIETHYLENE GLYCOL, ELIXIR OF SULFANILAMIDE-MASSENGILL AND "SYNTHETIC" ELIXIR

E. M. K. GEILING, M.D.
JULIUS M. COON, A.B.
AND
E. W. SCHOEFFEL, PH.D.
CHICAGO

Toxicity experiments were carried out on rats, rabbits and dogs on the following substances:

1. Pure diethylene glycol.
2. Pure sulfanilamide.
3. Elixir of Sulfanilamide-Massengill.
4. "Synthetic" elixir of sulfanilamide compounded by the A. M. A. Chemical Laboratory with pure substances in approximately the same proportions as found in the Massengill elixir (see Chemical Laboratory report).

Our experiments were devised to determine:

1. The toxic and lethal doses of each of the substances when given in relatively small doses three times daily. This information seems particularly necessary since we were not able to find any data in the literature on this specific point.
2. Our experiments were further planned with the hope of being able to reproduce in healthy experimental animals, in about the same time, the clinical and pathologic picture as presented by patients who had taken fatal doses of the Elixir of Sulfanilamide-Massengill.
3. Through our experiments we hoped to discern the toxic ingredient in the Massengill elixir.

All animals were healthy adults of both sexes and had free access to food and water. The drugs were admin-

Contribution from the A. M. A. Chemical Laboratory.

1. Compared with water 72 at 22.5 C.
2. Sulfanilamide is the name adopted by the Council for the product para-amino-benzene-sulfonamide. It was introduced into the United States under the proprietary term Prontylin, a brand of sulfanilamide manufactured by the Winthrop Chemical Company. It should not be confused with Prontosil, which may be considered a derivative of sulfanilamide. The word Prontosil unfortunately has been used to describe several substances. Prontosil Album is used in some foreign countries as a proprietary name for sulfanilamide.
3. In the different specimens examined, the diethylene glycol content varied from 70 to 75 per cent by volume.

From the Department of Pharmacology, University of Chicago.
Dr. C. W. Muhlberger, Mr. J. O. Austin and Mr. A. Rodaniche gave valuable assistance.

istered by stomach tube in the dosages stated in the tables. The doses selected ranged from apparently nontoxic to surely fatal ones.

From table 1 it will be seen that rats were given diethylene glycol in doses ranging from 0.5 to 4 cc., Elixir of Sulfanilamide-Massengill [1] in doses of from 0.625 to 3 cc., and "synthetic" elixir in doses of from 2.66 to 3 cc. per kilogram of body weight three times daily. Most animals receiving the 0.5 cc. doses survived for eight days in apparently good health. A few, however, were beginning to show ill effects at the time of writing. About 20 per cent of the animals receiving 1 cc. of diethylene glycol or Massengill elixir have died. All animals receiving doses of 2 cc. or more of any one of the foregoing died in from two to five days with a terminal anuria. The following is an average clinical picture as seen in rats: After about the fourth dose the animal's fur becomes ruffled, there seems to be increased thirst and diuresis, food is refused, later urine excretion becomes scanty, finally the animal lies on its side, respirations increase in rapidity and depth and anuria sets in, followed by coma and death. Rabbits present essentially the same picture (table 2) but seem to be more sensitive than rats. Dogs, too, behave similarly (table 3), but the dosage cannot be accurately determined because the animals vomit after the administration of both diethylene glycol and the elixirs.

Thus far we have found rats and rabbits to be more satisfactory experimental animals for this purpose than dogs.

Experiments were also performed in which sulfanilamide alone was administered by stomach tube to twelve dogs in divided doses of 0.2 Gm. per kilogram three times daily, for eight doses. At the end of this period the animals were divided into three equal groups, A, B and C. In group A two animals, dogs 2 and 4, were killed in order to see whether any significant pathologic changes had occurred in the kidneys or liver (see pathologic report). Dog 2 of group A had convulsions after the sixth dose of sulfanilamide alone but recovered. At necropsy no marked liver or kidney injury was seen. Dog 4 had no untoward reactions after administration of the sulfanilamide and showed no striking pathologic change at necropsy. The remaining two are still receiving sulfanilamide in 0.2 Gm. doses three times a day and are showing no untoward effects. Group B is receiving Massengill elixir three times daily in doses containing 0.2 Gm. of sulfanilamide. Two animals in this group refused food after the second dose; the third dog ate but vomited and the fourth ate and retained the food. Group C is receiving the "synthetic" elixir three times daily in doses containing 0.2 Gm. of sulfanilamide. In this group, two dogs refused food, the third ate but little and vomited, and the fourth ate and retained food after the second dose. The animals in both groups B and C that refused food are obviously sick at present.

Two additional dogs are receiving diethylene glycol alone in divided doses in an amount comparable to that of the diethylene glycol in the elixirs. One dog began vomiting after the second dose and at present he is moribund. The other animal began vomiting after the fifth dose and is showing weakness and tremors of the hind legs. Observations on these animals are being continued and a more detailed report will be forthcoming.

A similar experiment was carried out on sixteen rats, all of which received 0.25 Gm. per kilogram of sulfanilamide three times daily for seven doses. At the end of this period the animals were divided into four equal groups. Two rats of group 1 were killed for pathologic study and the other two continued on the same treatment of sulfanilamide. Group 2 received 2.5 cc. of Elixir of Sulfanilamide-Massengill per kilogram; group 3, 2.5 cc. of "synthetic" elixir per kilogram; group 4, 1.9 cc. of diethylene glycol per kilogram. All animals were dosed three times daily with the amount per kilogram mentioned. At the end of the fourth day all but three rats in groups 2, 3 and 4 were dead and these are expected to die on the fifth day. The two rats remaining in group 1 are apparently normal. The clinical course and the gross pathology were essentially similar in all the animals of groups 2, 3 and 4. Anuria was uniformly present. This experiment indicates clearly that it is the diethylene glycol and not the sulfanilamide which is the toxic agent.

A series of rats were also given diethylene glycol and the two elixirs of sulfanilamide in single large amounts of 5, 10 and 15 cc. per kilogram by stomach tube. After forty-eight hours all the rats of the 15 cc. doses were dead. After three days all the rats on the 10 cc. dose of the two elixirs had died, but only one of the three on the diethylene glycol was dead. All rats on the 5 cc. dose of the three preparations are seemingly well after five days (they will be killed for pathologic study). This series is too small at present to warrant any definite conclusions. We are, however, prompted to remark that it is possible that if the kidneys and the liver are rapidly injured by a large critical dose (10 cc.) of diethylene glycol, the sulfanilamide, especially in large amounts, may not be eliminated

TABLE 1.—*Data Obtained from Rats Treated Three Times Daily with Various Doses of Diethylene Glycol, Elixir of Sulfanilamide-Massengill and "Synthetic" Elixirs, and Sulfanilamide*

Drug	Dose per Kg. Three Times a Day	No. of Rats	Total No. of Doses	Total Amount of Drug Given per Kg.	Deaths: Number	Deaths: Per Cent
Diethylene glycol	0.5 cc.	4	24	12.0 cc.	0	0
	1.0 cc.	5	3	24	24.0 cc.	1	33.3
			2	13	13.0 cc.	1	50
	2.0 cc.	7	4	7	14.0 cc.	3	75
			3	8	16.0 cc.	3	100
	2.25 cc.	4		8	18.0 cc.	4	100
	3.0 cc.	3		7	21.0 cc.	3	100
	4.0 cc.	2		5	20.0 cc.	2	100
Elixir of sulfanilamide-Massengill	0.625 cc.	4		24	15.0 cc.	1	25
	1.25 cc.	3		24	30.0 cc.	0	0
	2.50 cc.	3		10	25.0 cc.	2	66.6
	2.66 cc.	4		9	24.0 cc.	4	100
	3.0 cc.	4		7	21.0 cc.	4	100
Synthetic elixir	2.66 cc.	4		8	21.3 cc.	4	100
	3.0 cc.	7	4	8	24.0 cc.	4	100
			3	7	21.0 cc.	3	100
Sulfanilamide	0.25 Gm.	2		24	6.0 Gm.	0	0
	1.0 Gm.	2		13	13.0 Gm.	0	0
H_2O controls	5 cc.	2		24	120.0 cc.	0	0

Comment: The rats were kept in cylindric 12 inch cages in groups of from two to four; these cages were placed on 12 inch funnels and the urine flow was observed in order to determine onset of anuria; food and water were available at all times.

1. In the experiments here reported the doses are larger than those used by human beings. The doses were selected to produce death in animals in about the same time and with the same symptomatology as occurred in the human beings taking the Massengill elixir. Experiments are now in progress with doses lower than 0.5 cc. per kilogram given three times daily. These experiments are indicated in view of the fact that Haag and Ambrose reported that rats succumbed when from 5 to 10 per cent of diethylene glycol was administered in the drinking water. Holck and Carlson found that rats succumbed after nine days when 4 per cent of diethylene glycol was given in the drinking water (unpublished data which we are permitted to quote).

or detoxified and may have an injurious action on other tissues. In this way sulfanilamide may then be regarded as having an additive toxic effect. This is suggested as a possible explanation for the fact that some of the rats on the 10 cc. amounts of diethylene glycol survived, while the animals on the elixirs succumbed. Additional experiments will have to be made to settle this point, which we believe to be interesting but not in conflict with our view that it is the diethylene glycol which is the important toxic factor (1) in the Elixir

TABLE 2.—*Data Obtained from Rabbits Treated Three Times Daily with Various Doses of Diethylene Glycol, Elixir of Sulfanilamide-Massengill and Sulfanilamide*

Cage No.	Number of Rabbit	Sex	Weight, Kg.	Drug	Dose per Kg., T.i.d.	Total Dose, T.i.d.	Total Number of Doses	Total Amount of Drug Given per Kg.	Total Amount of Drug Given	Time of Onset of Symptoms	Symptoms in Order of Appearance	Time of Death
1	1	♀	2.7	Diethylene glycol	0.5 cc.	1.35 cc.	20	10.0 cc.	27.0 cc.	72 hrs.	Loss of appetite, lassitude, diuresis, increased respiration, symptoms progressed slowly until death	213 hrs.
2	2	♀	2.6	Diethylene glycol	1.0 cc.	2.6 cc.	8	8.0 cc.	20.8 cc.	40 hrs.	Loss of appetite, diuresis, weakness, increased respiration, anuria, coma, death	61 hrs.
2	2B	♂	2.4	Diethylene glycol	1.0 cc.	2.4 cc.	8	8.0 cc.	19.2 cc.	36 hrs.	Loss of appetite, diuresis, weakness, increased respiration, anuria, coma, death	65 hrs.
3	3	♂	2.4	Elixir of sulfanilamide Massengill	0.67 cc.	1.6 cc.	20	13.4 cc.	32.0 cc.	60 hrs.	Slight loss of appetite, slight weakness; symptoms progressed slowly until death	176 hrs.
4	4	♂	2.75	Elixir of sulfanilamide Massengill	1.34 cc.	3.7 cc.	8	10.7 cc.	29.6 cc.	36 hrs.	Same as in cage 2	58 hrs.
4	4B	♀	2.6	Elixir of sulfanilamide Massengill	1.34 cc.	3.5 cc.	6	8.0 cc.	21.0 cc.	30 hrs.	Same as in cage 2	53 hrs.
5	5	♀	2.35	Elixir of sulfanilamide Massengill	2.0 cc.	4.7 cc.	6	12.0 cc.	28.2 cc.	30 hrs.	Same as in cage 2	48 hrs.
5	5B	♂	3.2	Elixir of sulfanilamide Massengill	2.0 cc.	6.4 cc.	5	10.0 cc.	32.0 cc.	30 hrs.	Same as in cage 2	43 hrs.
6	6	♂	2.5	Sulfanilamide	0.2 Gm.	0.5 Gm.	20	4.0 Gm.	10.0 Gm.	36 hrs.	Pallor in ears	Rabbit well after 7 days

Comment: All rabbits were kept in well cleaned metabolic cages with water and food available; all doses were given by stomach tube.

TABLE 3.—*Data Obtained from Dogs Treated Three Times Daily with Diethylene Glycol, Elixir of Sulfanilamide-Massengill and Sulfanilamide*

Number, Age, Sex and Race of Dog	Weight, Kg.	Drug	Dose per Kg., T.i.d.	Total Dose, T.i.d.	Total Number of Doses	Total Amount of Drug Taken per Kg.	Total Amount of Drug Taken	Time of Onset of Symptoms	Symptoms in Order of Appearance	Time of Death	Comment
1* 10 mo. male police ?	11.3	Diethylene glycol	1.5 cc.	16.9 cc.	6	9 cc.	101.4 cc.	20 hrs.	Weakness in hind legs, drunken gait, general lassitude, loss of appetite, increased respiration, diuresis, vomiting, thirst, anuria, coma, muscular tremors, spasms, delirium (barking), death	86 hrs.	Kept in cage 8′ × 8′ with free access to food and water; removed to metabolic cage after 62 hrs. to observe development of anuria
Dogs 1 and 2 were litter mates											
2 10 mo. male police ?	11.5	Elixir of sulfanilamide-Massengill	2 cc.	23 cc.	6	12 cc. elixir (9 cc. diethylene glycol, 1.2 Gm. sulfanilamide)	138 cc.	20 hrs.	Same as above except death followed convulsions after feeding of milk by stomach tube; autopsy revealed no milk in bronchi	62 hrs.	Kept in metabolic cage until death; cage kept clean; animal had free access to food and water
3 20 mo. male terrier	8.1	Sulfanilamide	0.2 Gm.	1.62 Gm.	6	1.2 Gm.	9.7 Gm.	24 hrs.	No loss of appetite, slight general lassitude with rapid and complete recovery after ceasing the administration of sulfanilamide	.....	On the 6th day this dog weighed 9.5 Kg., a gain of 1.4 Kg. since the beginning of the experiment

* Dr. Lillian Eichelberger of the Lasker Foundation, the University of Chicago, kindly made the following determinations on the blood from this animal, obtained at death.

p_H	6.93	Total protein	61.75 Gm. per liter of serum
Chloride	74.2 mM. per liter of serum	Nonprotein nitrogen	1.562 Gm. per liter of serum
Sodium	143 mM. per liter of serum	Albumin	36.21 Gm. per liter of serum
Potassium	13.6 mM. per liter of serum	Globulin	25.53 Gm. per liter of serum
A/G	1.42	Water	90.57 %

Note the low p_H and the high nonprotein nitrogen and potassium. The changes in blood chemistry are proof of the terminal uremia in our experimental animals. Through the courtesy of Prof. H. Gideon Wells, director of the Otho S. A. Sprague Institute, the University of Chicago, Dr. Carl Marberg is cooperating with us in a more detailed study of the fate of diethylene glycol in the animal body and the changes induced in the blood chemistry following ingestion of the drug. Renal and liver function tests will also be carried out on animals treated with diethylene glycol. More complete studies of the rate of elimination of sulfanilamide when administered as the elixir will be carried out.

of Sulfanilamide-Massengill when given to human subjects in the amounts recommended on the label, and also (2) to our experimental animals when given in divided smaller doses. We are planning to repeat the foregoing experiments and also will give a large single amount of diethylene glycol, to be followed by a large single amount of sulfanilamide, accompanied by chemical determinations.

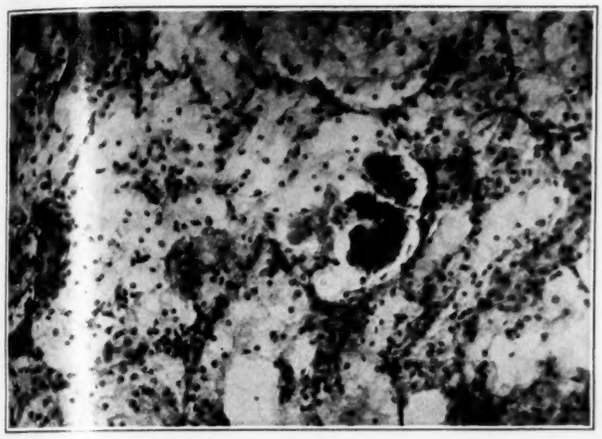


Fig. 1.—Kidney of rat that ingested 3 cc. per kilogram of the "synthetic" elixir of sulfanilamide three times daily. Killed in a moribund condition after fifty-three hours.

Mr. Millberg, of our department, made numerous differential blood counts on animals receiving sulfanilamide alone, Elixir of Sulfanilamide-Massengill, "synthetic" elixir, and pure diethylene glycol. He did not find evidence which would indicate agranulocytosis.

We are privileged to say that Dr. Herbert O. Calvery, chief pharmacologist of the Food and Drug Administration, Washington, D. C., and his staff are conducting experiments which are in general accord with our own observations. Their results will be published in detail.

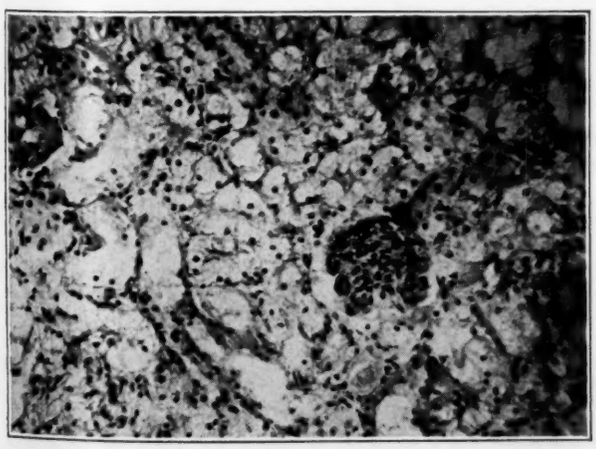


Fig. 2.—Kidney of rat that ingested 4 cc. per kilogram three times daily of a 33⅓ per cent solution of pure diethylene glycol. Killed in a moribund condition after forty-five hours.

There are of course many other ramifications of this problem which have not been touched on in this preliminary report.

SUMMARY AND CONCLUSIONS

1. Our experiments thus far warrant the belief that diethylene glycol is the toxic agent in the Elixir of Sulfanilamide-Massengill examined, because experimental animals given diethylene glycol alone exhibit essentially the same clinical course and pathologic changes in the kidney and liver as do those treated with similar doses of the Elixir of Sulfanilamide-Massengill or a "synthetic" elixir containing the ingredients and in the same proportion found in the Massengill preparation by analysis. There are, of course, individual and species differences. Thus far we have found the rat and the rabbit more satisfactory subjects than the dog because with them emesis is not a complicating factor.

2. Sulfanilamide alone if given in doses of 0.2 Gm. per kilogram three times daily does not prove fatal to rats, rabbits or dogs after eight or more divided doses. However, if sulfanilamide is given in this dosage in the form of Elixir of Sulfanilamide-Massengill or in the "synthetic" elixir, it proves fatal to experimental animals and presents a clinical and pathologic picture closely resembling that reported for the human cases in which death occurred after ingestion of the Massengill elixir.

3. Although animals receiving sulfanilamide in doses of 0.2 Gm. per kilogram three times daily did not succumb, several of them had convulsions. Six animals (two dogs and four rats) were killed after

Fig. 3.—Kidney of dog that ingested 1.5 cc. per kilogram of pure undiluted diethylene glycol three times daily. Died in eighty-six hours.

having received eight or more divided doses of the drug. None of them had anuria, nor did they exhibit the renal and hepatic changes found in animals treated with either the Massengill or the "synthetic" elixir (see report of pathologic observations). While we do not believe that the sulfanilamide had any important part in the intoxications resulting from the elixir of sulfanilamide, one must not overlook the possible damage to tissues that may result when sulfanilamide is administered to experimental animals or to human beings with impaired renal function. This point is being investigated.

4. Our experiments emphasize the importance of administering drugs in divided doses to experimental animals when it becomes necessary to know whether or not a drug has cumulative effects. Errors resulting from an oversight of this important pharmacologic principle may be costly in human lives.

We can confirm the finding of Haag and Ambrose [2] that the ingestion of 15 cc. of diethylene glycol per kilogram in a single dose by stomach tube proves fatal to rats. This figure, however, is no index of the toxic and possible fatal effects of the drug, if administered in small divided doses, especially since neither the fate

2. Haag, H. B., and Ambrose, A. M.: J. Pharmacol. & Exper. Therap. **59**: 93 (Jan.) 1937.

nor the mechanism of detoxification is known. This substance possibly produces injury to certain cells at a rate faster than the repair processes take place; hence each succeeding dose may be adding insult to injury.

[NOTE.—After this article went to press a communication was received from Dr. E. K. Marshall Jr., too late for inclusion in this report. In this communication he discussed the results in his experiments to date in reference to diethylene glycol, Elixir of Sulfanilamide-Massengill, and sulfanilamide. In general his experiments show that sulfanilamide alone is not responsible for elixir deaths. Large doses of sulfanilamide administered to rats and dogs revealed no functional kidney damage.—P. N. L.]

IV

PATHOLOGIC EFFECTS FOLLOWING THE INGESTION OF DIETHYLENE GLYCOL, ELIXIR OF SULFANILAMIDE-MASSENGILL, "SYNTHETIC" ELIXIR OF SULFANILAMIDE AND SULFANILAMIDE ALONE

PAUL R. CANNON, M.D.
CHICAGO

Preliminary studies have been made of organs from dogs, rats and rabbits given toxic doses stated to be Elixir of Sulfanilamide-Massengill, "synthetic" elixir of sulfanilamide, and diethylene glycol. The present

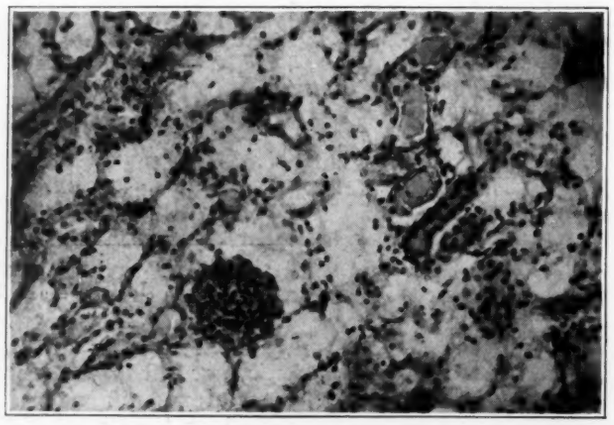


Fig. 4.—Kidney of rabbit that ingested 2 cc. per kilogram three times daily of Elixir of Sulfanilamide-Massengill. Killed in a moribund condition after forty-eight hours.

report deals particularly with animals that died or were killed in a moribund state after ingestion of varying amounts of these materials. The general appearances at necropsy were as follows: The kidneys were swollen, with tense capsules and bulging, bloody surfaces, containing, in some instances, small areas of recent hemorrhage. The cortices were swollen and were usually pale. The heart was dilated and the body as a whole showed marked acute generalized passive congestion. The liver was frequently mottled and bloody but was not greatly enlarged. Pulmonary edema or bronchopneumonia was present. Clear fluid was occasionally present in the peritoneal and pleural cavities. The urine was clear and pale yellow; the gastro-intestinal tract appeared essentially normal. The leptomeningeal veins were distended and the brain was tenser than usual, with, in some instances, an increase in subdural spinal fluid.

From the Department of Pathology, the University of Chicago. Dr. H. G. Wells gave valuable counsel.

Microscopically, the most marked changes observed thus far have been in the kidneys and liver. In the former there is an intense hydropic degeneration of epithelium of the convoluted tubules, so marked that the lumens are obliterated and the normal structure is greatly altered. Albumin and hyaline casts are present within the lumens of both convoluted and collecting

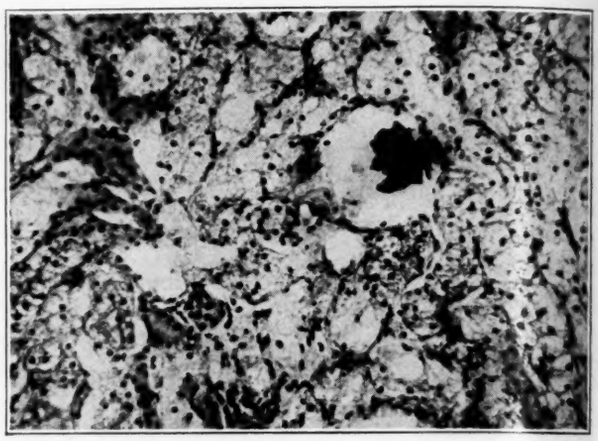


Fig. 5.—Kidney of rat that ingested 3 cc. per kilogram three times daily of Elixir of Sulfanilamide-Massengill. Died in fifty-eight hours. In figures 1 to 5 note the hydropic degeneration of epithelium of convoluted tubules, the precipitated albumin in their lumens and the casts. Note also the shrunken but relatively unchanged glomerular tufts and the absence of leukocytic infiltration or vascular damage.

tubules. In some animals the epithelium of the convoluted tubules is necrotic and the cells have disappeared. The collecting tubules are relatively unchanged, although fat stains show varying degrees of fatty degeneration. The glomerular tufts are shrunken, although their capillaries are filled with blood. Albumin is also present in many of the glomerular spaces. Leukocytes are inconspicuous. The arteries, arterioles and venules appear normal.

Sections of livers show hydropic degeneration of hepatic cells, most marked around the centers of the lobules. Fatty changes are present but are not as

Fig. 6.—Liver from rat that ingested 4 cc. per kilogram three times daily of pure undiluted diethylene glycol. Died in thirty-nine hours. Note the hydropic swelling of hepatic cells with their shrunken and pyknotic nuclei, and the absence of leukocytic infiltration.

noticeable in the areas of hydropic degeneration as at the borders of the hydropic areas. Necrosis of liver cells is not severe, although there is some shrinkage of nuclei, pyknosis and nuclear fragmentation. Leukocytic infiltration is minimal.

A few sections from the lungs show marked congestion, edema and bronchopneumonia. The myocardium

appears essentially normal, although fat stains in some instances show an early fatty degeneration. Other organs have not been examined microscopically as yet, nor have the tissues from animals receiving nonfatal doses of diethylene glycol.

The general picture is that of a severe chemical nephrosis with intracellular edema of most of the epithelial cells of the convoluted tubules, resulting in tubular obstruction by compression and by the intraluminal formation of casts. The pathologic picture is essentially similar in the three species of animals, whether given the Elixir of Sulfanilamide-Massengill, the "synthetic" elixir of sulfanilamide or diethylene glycol alone. This intracellular edema in the kidneys leads to internal disorientation of cells of the convoluted tubules and offers an explanation for the tubular obstruction, anuria, uremia and death. Whether this intracellular change is due to cellular anoxia, with consequent intracellular edema, necrosis, fatty degeneration and cellular desquamation, or whether it is due to hygroscopic properties of diethylene glycol are questions that must await further investigation.

These changes in the kidneys and liver are not due to sulfanilamide alone. We have examined sections from two dogs and four rats given sulfanilamide in divided doses, with toxic manifestations in one dog. The microscopic changes are slight, consisting of moderate fatty degeneration in some of the collecting tubules of the dogs, but minimal in the rats. The livers of both dogs and rats showed no hydropic degeneration and practically no fatty degeneration. There is but little question, therefore, that the severe chemical nephrosis of the dogs, rats and rabbits is due to diethylene glycol alone. We cannot say, however, that under conditions of anuria, with retention of sulfanilamide in the blood stream, some tissue damage by sulfanilamide may not be added to that of diethylene glycol.

We have had the opportunity to examine organs from five persons who died in or near St. Louis after ingestion of Elixir of Sulfanilamide-Massengill. There is a striking similarity between the pathologic changes in the kidneys and livers in these cases and in those of the experimental animals given Elixir of Sulfanilamide-Massengill, the "synthetic" elixir, or diethylene glycol alone. The most striking changes in the human cases are hydropic degeneration of the convoluted tubules with desquamation of epithelium, fatty degeneration, tubular necrosis, hemorrhage, and obstruction of tubules by casts. In one case there is also marked recent infarction with hyaline thrombi in many of the smaller arteries. The lobular hydropic degeneration of hepatic cells is also a prominent feature in the livers from these patients.

The accompanying photomicrographs show the characteristic pathologic changes in the kidneys and livers of rats, dogs and rabbits given Elixir of Sulfanilamide-Massengill, "synthetic" elixir, or diethylene glycol. Figures 1, 2, 3, 4 and 5 show the hydropic degeneration of epithelium of the convoluted tubules; figure 6, the lobular hydropic degeneration of hepatic cells in the liver. These are all from frozen sections of formaldehyde-fixed tissue stained with hematoxylin and eosin with a magnification of 260 diameters.

Conclusion.—There is a marked similarity in the pathologic picture in animals and in man following the ingestion in divided doses, toxic to the species, of a lethal amount of Elixir of Sulfanilamide-Massengill in man; or of diethylene glycol, the "synthetic" elixir, or Elixir of Sulfanilamide-Massengill, in animals.

V

CLINICAL AND PATHOLOGIC OBSERVATIONS BY DR. HOMER A. RUPRECHT AND DR. I. A. NELSON, TULSA

[The following telegram (October 15) was received at the A. M. A. headquarters from Dr. Homer A. Ruprecht and Dr. I. A. Nelson of the Springer Clinic:]

Total of ten cases. Eight dead. One recovered. One critical. Ages from eleven months to twenty-six years. All received Elixir Sulfanilamide in amounts varying from one-half to seven ounces. Characteristic onset with nausea, vomiting, occasional diarrhea, malaise, later pain over kidney region and abdomen. All developed anuria within two to five days after beginning medication. Indications for the use of sulfanilamide were varied. Nine cases hospitalized. Characteristic physical findings were deep respirations, drowsiness, cutaneous pallor, no cyanosis, slight puffiness of face. Blood pressure normal or slightly elevated; tenderness over kidneys and upper abdomen. Three cases voided small amounts of urine which showed four plus albumin, casts and cells insignificant, no lipoids, no anemia, moderate leukocytosis, nonprotein nitrogen progress to near two hundred total, creatinine up to twelve. Patients become progressively comatose. Edema and ascites related to water administration. Death in two to seven days from onset of anuria. Postmortem findings on five cases are yellow tawny color of smooth and not enlarged liver; slight to marked purplish mottling of kidney surfaces, with severe cases showing necrosis limited to superficial portions of cortex. Inconstant peritoneal, pleural and pericardial accumulations of clear straw colored fluid which gels. Rest of viscera insignificant. Microscopic findings show a consistent hydropic tubular nephrosis and central degeneration of liver with cells showing foamy cytoplasm. Sudan stains show (little) fatty degeneration. Consider microscopic picture similar to literature on dioxane; see Navanquez, J. Hyg. vol. 35, pages 540-548. Cannot find evidence of oxalic acid in gross nonmicroscopic tissues nor fluids. No calcium oxalate crystals.[1] Have complete viscera from one case in frozen state without fixation. Can send stained sections, portions of fixed or frozen tissues. Federal inspectors arrived today.[2]

VI

NECROPSIES OF FOUR PATIENTS FOLLOWING ADMINISTRATION OF ELIXIR OF SULFANILAMIDE-MASSENGILL

O. E. HAGEBUSCH, M.D.
ST. LOUIS

[Without knowledge of the deaths at Tulsa, Okla., Dr. O. E. Hagebusch sent the following report under date of October 19 for proposed publication in THE JOURNAL:]

In the last several days I have seen four deaths in patients using a product called "Elixir of Sulfanilamide" and sold by Massengill & Company.

1. A suggestion had been telegraphed to Dr. Ruprecht October 12 that possibly there might be oxalate crystals in case the diethylene glycol contained ethylene glycol.

2. In a letter from Dr. Ruprecht of October 11, he stated: "One of the latter two patients had received tablets of sulfanilamide over a period of two weeks without any bad effects and then changed doctors and the second doctor put him on the elixir of sulfanilamide and the typical train of symptoms followed shortly afterward."

Dr. Darwin B. Childs of Tulsa, Okla., in speaking of cases brought to his attention stated: "A patient, a 20 year old adult, who had an acute gonorrhea, took a total of 220 grains, as represented by 55 teaspoonfuls of the elixir of sulfanilamide. Twenty-four hours after the ingestion of this amount he began to have symptoms of an acute nephritis, and forty-eight hours later he was totally anuric. He died four days after receiving the last dose. The clinical picture and autopsy reports of this case closely resemble each of the other cases."

These patients, all Negroes, were treated by a Dr. Weathers of East St. Louis, Ill. In all he has given the drug to about thirty people, but of the six people treated recently four are dead and have come to autopsy. One is expected to die at any time, and one may recover.

All have had similar symptoms: vomiting and diarrhea, subnormal temperatures, slow respiration, anuria, edema of the face, hands and feet, a progressive anemia and then death.

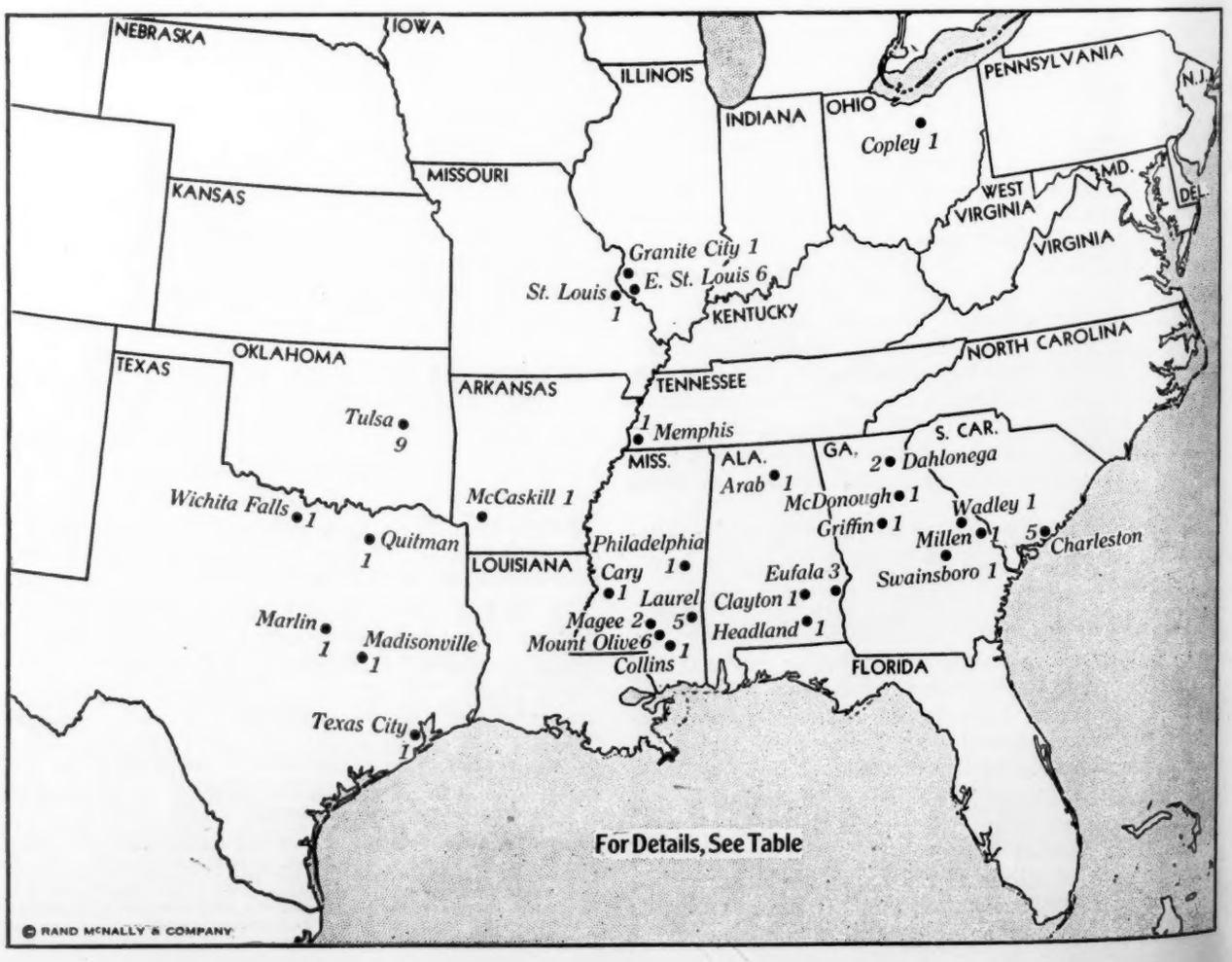
All four autopsies have shown the same findings; pulmonary edema, marked nephritis with hemorrhage into

Reported Deaths from Elixir of Sulfanilamide-Massengill

State	City	Reference Number	Demise
Alabama	Arab	1	10-16-37
	Clayton	2	9-24-37
	Eufaula	3	9-20-37
	Eufaula	4	10-13-37
	Eufaula	5	10-17-37
	Headland	6	9-25-37
Arkansas	McCaskill	7	10-24-37
Georgia	Dahlonega	8	9-29-37
	Dahlonega	9	10-19-37
	Griffin	10	10-18-37
	McDonough	11	10- 6-37
	Millen	12	10-16-37
	Swainsboro	13	10-26-37
	Wadley	14	10-21-37
Illinois	East St. Louis	15	10-15-37
	East St. Louis	16	10-16-37
	East St. Louis	17	10-18-37
	East St. Louis	18	10-18-37
	East St. Louis	19	10-21-37
	East St. Louis	20	10-24-37
	Granite City	21	10-10-37
Mississippi	Cary	22	10-17-37
	Collins	23	10- 9-37
	Laurel	24	10- 5-37
	Laurel	25	10- 5-37
	Laurel	26	10-11-37
	Laurel	27	10-20-37
	Laurel	28	no date
	Philadelphia	29	10-20-37
	Magee	30	10- 5-37
	Magee	31	10-17-37
	Mount Olive	32	10- 8-37
	Mount Olive	33	10-14-37
	Mount Olive	34	10-16-37
	Mount Olive	35	10-19-37
	Mount Olive	36	10-20-37
	Mount Olive	37	10-21-37
Missouri	St. Louis	38	10-25-37
Ohio	Copley	39	
Oklahoma	Tulsa	40	Before 10-18-37
	Tulsa	41	
	Tulsa	42	
	Tulsa	43	
	Tulsa	44	
	Tulsa	45	
	Tulsa	46	
	Tulsa	47	
	Tulsa	48	
South Carolina	Charleston	49	10- 4-37
	Charleston	50	10-12-37
	Charleston	51	10-13-37
	Charleston	52	10-30-37
	Charleston	53	10-30-37
Tennessee	Memphis	54	10-20-37
Texas	Madisonville	55	10-18-37
	Marlin	56	10-12-37
	Quitman	57	10-20-37
	Texas City	58	
	Wichita Falls	59	
Total Deaths		59*	

* To the best of our knowledge this list comprises the deaths confirmed by telephone, telegraph or other authoritative communication resulting from the administration of Elixir of Sulfanilamide-Massengill up to and including October 29; no responsibility however, is assumed for its absolute correctness. In some cases the list does not indicate the residence address of the patient but the address of the attending physician or the place of death of the victim.

Since this table was set in type, two more deaths have been reported, bringing the total up to sixty-one (November 1).



the cortex of the kidney, marked hemorrhage into the pericardium, mucosa of the stomach and duodenum and into the serous surfaces of lung and liver. The liver is pale, edematous and enlarged. Microscopic sections have not as yet been completed.

It was thought that this information should be in the hands of as many physicians as possible, and THE JOURNAL was the best means of accomplishing this end.

VII

SURVEY OF DEATHS

Deaths and clues of deaths were reported to the American Medical Association headquarters by various press services, by information received from physicians, and chiefly clues from the Food and Drug Administration. The latter organization placed a tremendous force of inspectors in the field. It obtained a list of approximately 700 shipments from the manufacturer. The inspectors then traced every shipment to its final designation. If the bottle had been opened, they inquired to whom it had been dispensed. It was in this manner that most of the deaths were traced after the original reports from Tulsa and East St. Louis. Each suspected case of death was then checked by the American Medical Association by telephoning or telegraphing physicians or other medical authorities. On an accompanying page is given the list of cities in which deaths occurred, the number of deaths reported to the Association to October 29, and the date on which it has been stated that the patient died. There are many additional reports not confirmed as yet.

Antidote.—On October 20 the S. E. Massengill Company sent the following telegram:

> Please wire collect by Western Union suggestion for antidote and treatment following use Elixir Sulfanilamide.

The following reply was sent:

> Antidote for Elixir Sulfanilamide-Massengill not known. Treatment presumably symptomatic.

So far as has been determined, there is no known antidote for diethylene glycol poisoning when the drug is administered in amounts comparable to that given the unfortunate victims. Telegrams were sent to Dr. E. J. Marshall Jr., Dr. W. F. von Oettingen and Dr. P. J. Hanzlik for suggestions. One suggested the use of gastric lavage, calcium therapy orally and intravenously, and symptomatic treatment for nephrosis. Another telegraphed: "Cannot suggest any possible antidote or treatment for patient with Elixir Sulfanilamide poisoning. Fifty per cent dextrose solution with or without sodium bicarbonate intravenously might be tried." Another suggested the use of 20 per cent dextrose solution intravenously to relieve renal edema if possible.

VIII

CONCLUSIONS

1. Elixir of Sulfanilamide-Massengill in the specimens examined was found to consist essentially of sulfanilamide 10 Gm. in 100 cc. of a solution of approximately 72 per cent diethylene glycol and water 25 per cent by volume, to which had been added flavoring and coloring material.

2. Diethylene glycol in the doses given was the causative agent in deaths.

3. Pathologic results reported herewith both on animal and on man, as well as many reports received by telephone and telegram, indicate that, in cases of death following the administration of Elixir of Sulfanilamide-Massengill, anuria was present.

4. While sulfanilamide does not appear to have had any appreciable part in the toxicity of this preparation, it is well to emphasize again that sulfanilamide should be used cautiously and, until more is known of its pharmacology, should not be administered concurrently with any other substance except sodium bicarbonate (see editorial in THE JOURNAL, October 2, p. 1128, and reports by the Council on Pharmacy and Chemistry in THE JOURNAL May 29, p. 1888, and July 31, p. 358).

5. Diethylene glycol, when taken in divided doses and in amount comparable to those recommended by the manufacturer for Elixir of Sulfanilamide-Massengill, is a decidedly toxic substance and cumulative poison; the pathologic picture was the same in animals that received a 75 per cent solution of diethylene glycol alone, a synthetic mixture made of 10 Gm. of sulfanilamide in 100 cc. of a 75 per cent solution of diethylene glycol, and the Elixir of Sulfanilamide-Massengill.

Special Article

MEDICAL PATENTS

MORRIS FISHBEIN, M.D.
Editor of the The Journal of the American Medical Association and of Hygeia, the Health Magazine
CHICAGO

In the Principles of Medical Ethics of the American Medical Association it is stated quite plainly that:

> It is unprofessional to receive remuneration from patents for surgical instruments or medicines; to accept rebates on prescriptions or surgical appliances, or perquisites from attendants who aid in the care of patients.

Through the centuries medicine has given freely of its discoveries for the benefit of mankind. Vaccination against smallpox, inoculation against hydrophobia, digitalis and innumerable other methods and medicaments became the property of all who cared to employ them in the control of disease. Now as medicine has become more complex, involving technical assistants in the fields of biochemistry, physiology, physics and associated branches, great numbers of people who give their full time to the work of the hospital, the laboratory or the care of the sick work with the medical profession but are not bound in any way by the same ethical principles.

Research workers in many universities have developed preparations and technics in their laboratories at considerable expense to the institution. Workers in some instances have seen fit to turn over to the universities the control of such products. In other instances universities have refused to accept such responsibilities and the worker has taken some other method of administering the control of his discovery.

LACK OF UNIFORMITY

There appears to be no uniformity in the approach to this problem or in the decisions and rulings of various institutions on this subject. Insulin is controlled by the governors of the University of Toronto. Scarlet fever preparations are controlled by the Scarlet Fever Committee, Inc. Vitamin D preparations by irradiation are controlled by the Wisconsin Research Alumni Foun-

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Read before the American Chemical Society, Rochester, N. Y., Sept. 7, 1937.

dation of the University of Wisconsin; the Sperti patents for vitamin D by the University of Cincinnati; the Zucker patents for vitamin D by Columbia University; the Doisy patents for theelin by St. Louis University School of Medicine, and several others covering drugs by Stanford University and the University of California.

In 1934 a special committee of the American Association for the Advancement of Science recognized the desirability of obtaining patents for purposes of control. It pointed out that the act of securing patents for medical discoveries is not unethical in itself and that such act does not necessarily mean that personal profits are sought. It recognized the desirability for a patent in order to protect a manufacturer who wished to develop a product on a large scale. It recognized the tremendous expense which might be involved in developing an invention and the use of a patent to recoup the money spent in research. It recognized, finally, the right of a university with limited funds for research to use patents developed in its laboratories for encouraging further research.

Not only does the University of Toronto administer the insulin patent but in association with the university there is a pediatric research foundation which derives funds from discoveries that are used in the university for research.

The University of California administers the product called tethelin, developed by Robertson, formerly professor of chemistry and pharmacology. This patent is administered by a committee of five members of the faculty under the control of the regents of the university.

The board of trustees of the University of Pennsylvania in 1934 established the policy that any invention or discovery which may in any way affect the public health, such as a new drug, process or apparatus intended primarily for medical or surgical use, should not be patented for profit, either by the individual in the employ of the university or by the university itself. In order to prevent capitalization and exploitation by others, it is pointed out, the executive committee may from time to time consider it advisable to patent inventions or discoveries with the sole intent of protection without profit. In a later resolution it was stated that patents may, with the approval of the president of the university, be applied for, covering other inventions or discoveries, in which case the inventor shall assign his rights to the patent to the university on its paying the expense of securing the patent. Furthermore, it was left to the executive committee to determine what proportion of the profits, if any, should be given to the individual concerned, except that no profit was to be derived from patents or discoveries that may in any manner affect the public health.

Columbia University has set up an administrative board of medical patents with authority to accept or direct the development of discoveries made in its laboratories. This board is empowered to make arrangements for the use, manufacture, sale or other disposition of patents or discoveries. St. Louis University controls the Doisy patents on theelin and from the funds derived makes grants for research. The University of Illinois provides for the assignment of patents to the university and has set up committees for control; likewise Lehigh University. Harvard University has no specific rule about patents, except that no member of the medical school or of the school of public health is permitted to take out a patent for his own profit or take any profit on a patent or on any invention or discovery that affects the health of individuals or of the public. If, however, to protect the public against misuse of the invention or discovery it becomes necessary to obtain a patent, it is possible to apply for this under such a name or conditions as the corporation or board of governors of the university may determine. The Johns Hopkins University in 1933 through the advisory board of the medical faculty went on record to the effect that it was undesirable for any member of the medical faculty to take out a patent on any discovery that might affect the public health. The University of Michigan provides also for the control of patents. Under the regulations of the Massachusetts Institute of Technology, any inventions resulting directly from research become the exclusive property of the institute, which, it is understood, the institute will administer for the benefit of the public. In case the institute decides not to acquire these rights, all or a part of them goes to the individual who made the invention.

The University of Minnesota has several patents and it has been held that it is not improper to use the control of patents as a means of adding to the research funds of the university. The thyroxine patent is one in the field of public health which this university controls. The University of Cincinnati has a large number of patents covering the preservation of food and in a recent decision has reserved to itself all medical discoveries to be administered for the public good. In 1932 Cornell University also arranged through a separate corporation to administer patents but has made no decision as to the distribution of royalties. The iodobismitol patent, now controlled by Stanford, is to be administered for the support of research in the medical school.

POINTS OF VIEW OF NATIONAL ORGANIZATIONS

In addition to the stipulations made by various universities, this problem has been considered by many national organizations in the field of science. The National Research Council permits the acquiring of patents arising from work which it has supported and the dedication of such patents to the public good. In fact, it announces the policy that those who make discoveries will apply for patents and that such patents will be assigned to the National Research Council.

The Carnegie Institution announced in 1923 its expectation that new and useful inventions or discoveries which resulted from research that it financed would be dedicated to the public use and that such patents would be assigned to the Carnegie Institution.

The Rockefeller Institute has recognized the necessity of patenting for purposes of control with the understanding that administration will be for the public good and that all such funds will be devoted to public purposes. Tryparsamide is one of the products on which the Rockefeller Institute holds a patent.

The Mellon Institute, which is largely supported by funds from commercial donors, controls patents with a contract whereby the discoveries are patented by the worker and the patent turned over to the donor, who makes the regulations as to control. This institute holds some 500 patents. Under the regulations of the Chemical Foundation, patents are assigned to the foundation, which then administers them under a licensing system,

setting aside a portion for the disposal of the discovery and the remainder for research.

This subject, which has attracted so much attention for so many years, has also been commented on by many of the leaders in the field of medical thought. In 1927 Dr. Hans Zinsser pointed out that the relief of the sick and the prevention of unnecessary sorrow by the maintenance of individual and public health are not to be compared with the invention of improvement in the mechanism of automobiles or of a shoe buckle. Any procedure that prohibits the most rapid and useful application of a discovery to the needs of a community would seem to be as unjustified as cornering the wheat market.

METHODS BY WHICH MEDICAL INVENTIONS CAN BE PATENTED

In its survey of this subject the American Association for the Advancement of Science outlined the methods by which medical inventions can be patented in this country:

(*a*) Methods of medical treatment are in general difficult to patent, because the Patent Office is very reluctant in granting such patents. It appears that the courts have not definitely decided whether this type of invention is patentable. An old decision of the Patent Office held such patents to be contrary to public policy.

(*b*) Any remedial compound which is nothing more than such a mixture of medicinal agents as could be made by the exercise of the ordinary skill of a physician is not patentable. In the past, the Patent Office granted many patents for all sorts of remedial compounds, which were hardly more than physicians' prescriptions or at best were mixtures of known remedial compounds. Many of these patents were used as a means of exploiting the public with false claims and pretenses. The Patent Office today therefore refuses to grant patents for this type of remedial compound unless it can be shown that an entirely new and unforeseen result is obtained and that the ingredients coact to produce an entirely new result.

(*c*) New chemical compounds, organic and inorganic, having some remedial value can generally be patented. A large number of medicinals on the market are patented. The new compound is patentable as such and not necessarily as a medicine.

(*d*) Certain biological products and the processes for producing them may also be patentable. The Dick patent for scarlet fever toxin is a good example.

(*e*) Processes for manufacturing chemical compounds are patentable when they are novel and have not been previously used, known or described in the literature.

(*f*) The discovery of the medicinal or other properties of known compounds can in some instances be protected by a patent.

(*g*) Instruments, apparatus and so on, used in medical and surgical practise can also be patented.

Our patent laws are very liberal with regard to medical inventions as compared with those of European countries. In France, it is stated, pharmaceutical compositions or remedies of all kinds are excluded from protection. In Germany articles of food, medicines and substances manufactured by a chemical process are not patentable so far as the inventions do not relate to a distinct process of manufacturing such products. In England, it is said, foods and medicines are not patentable per se but the methods of manufacturing them may be patented. It should be pointed out that control of the process is just as effective as the patent of an article itself and that in many instances monopoly may be maintained by copyright of a well established name which is better than a monopoly dependent on the protection of a patent against infringement.

ATTITUDE OF AMERICAN MEDICAL ASSOCIATION

The attitude of the American Medical Association with regard to patents, aside from the inclusion of the clause already quoted in the Principles of Medical Ethics, was expressed by the House of Delegates in June 1914. The Judicial Council at that time recommended the adoption of the following resolution, which was thereupon duly adopted by the House of Delegates:

Resolved, That the Board of Trustees of the American Medical Association shall be permitted to accept, at their discretion, patents for medical and surgical instruments and appliances and to keep these patents as trustees for the benefit of the profession and the public; provided, that neither the American Medical Association nor the patentee shall receive remuneration from these patents.

The Board of Trustees of the Association has not, however, as yet accepted any patents or endeavored to work out any plan for the administration and control of patents in the medical field. Since 1914, at various times, committees have been set up by the Board to study the problem and to report. No such final reports have, however, thus far been made available.

ADVANTAGES AND COMPLICATIONS IN TAKING OUT OF PATENTS

There are many arguments which may be made for and against the taking out of patents. When a patent is granted, those who control the patent regulate the production of the product so as to insure its quality. The owner of the patent may control the price to a considerable extent, thereby preventing exploitation. The owner of a patent may limit the production of the goods to organizations capable of making the best possible product and eliminate those capable of such production.

One of the chief complications in this field in recent years has developed from the fact that inventions or discoveries are far more frequently the result of the efforts of a number of workers than of any single discoverer and that in many instances only one of the group of workers may be a physician unauthorized to accept remuneration, whereas all of the others, because they are pharmacists, chemists, biochemists, physicists or physiologists, are not inhibited by such principles of ethics as control the medical profession.

In an earlier day, the doctor who developed a new device or appliance would manufacture a few with the aid of some neighboring blacksmith or carpenter. In modern times, industry is capable of turning out many thousands of units, in contrast to the ten or fifteen that might have been used formerly. Insulin was developed by biochemists, physiologists and a practicing physician. Certainly the name of Banting, the physician, is as much to be credited for the discovery of insulin as the names of his colleagues Macleod, Collip and Best. It is no secret that it became necessary to patent this discovery in order to control it, that Banting received one dollar for the sale of the patent to the University of Toronto, and that he derives not one cent of royalty from his discovery. The funds derived are largely spent on research under the control of the discoverers.

NEED FOR REVISION IN MEDICAL POINT OF VIEW

Our new order of living in the machine age, the development of specialization in medical practice, the incorporation of great industries for the exploitation of discoveries made in the laboratories and similar factors emphasize the need for some revision in the medical point of view concerning medical patents. The control

of such patents by universities has to some extent assured standardization of products. Usually only reputable firms capable of developing and exploiting products honestly are granted licenses to participate in the manufacture and sale of products controlled by the universities, although there are glaring exceptions.

While it is obvious that the entire trend of the times is toward the holding and control of patents, both medical and nonmedical, by educational and research institutions in order to provide suitable administration of the discoveries for the benefit of the public, it is obvious also that there are some arguments opposed to the holding of patents by universities. One of the most cogent arguments now advanced concerns the relationship of the university or research institute to taxation. Endowed universities and research institutions as well as scientific organizations and trust funds in the interest of the public are usually exempt from taxation. They are nonprofit organizations. They owe a definite duty to the public, which bears the burden of taxation. Universities must consider the extent to which exploitation of patents for the benefit of the institution may not bring on them the new burden of taxation from which they are now exempt. The exploitation of patents by universities places them in direct competition with one another. For example, there are now many patents concerned with the development of vitamin D. Because of the financial interests involved, the results of current research are jealously guarded and probably all research is being delayed through failure of research workers to communicate with one another. Indeed, it is known that workers in the same university, because of the rewards involved, may develop a competitive spirit which is likely to destroy entirely the type of cooperation in science which is responsible for much of our current progress. Such competition, in fact, defeats the whole purpose of a university. This point of view was beautifully expressed by Mr. G. W. Gray in his article on "Science and Profits" in *Harper's Magazine* for April 1936, when he said:

> Scientific research, as a recognized full-time occupation, is one of the youngest of the professions. It has come up out of the basements and garrets of the early experimenters, and has attained status among the most honored of the callings of man. Perhaps the laboratory is pressed with economic necessity—but is that warrant for changing its charter? Possibly it can support itself handsomely and independently—but can it survive the shiftings of bases and the readjustments of outlook which commercialization entails? One of its greatest glories is its intellectual integrity and independence—but can this reputation continue unsullied in the clash of competitive sales campaigns of patented commodities, infringement suits, and other contentions of the marketplace in which the financial interest of the research institution is on one side of the dispute?

Patents are not administered by laws but by men. Contracts are not made by universities but by men. The difficulties which have arisen thus far in the control of patents in the medical field would seem to be difficulties which might easily have been avoided with the development of a proper spirit by those who administered the patents and by those who wished to use them. The difficulties are apparent in the various suits for infringement which have been filed from time to time in the courts and in the stipulations laid down by those who control the patents in relationship to research by others who might wish to carry the work still further.

The patents in the medical field which have aroused the most debate and trouble at present are the scarlet fever patents held by the Scarlet Fever Foundation, the copper-iron patent held by the University of Wisconsin, and perhaps also the various patents concerned with the production of vitamin D and vitamin D products. The sun in the sky should be freely available to all who wish to use it. Yet it has been hinted that there are some concerned with patents on vitamin D who would even inhibit investigators from experimenting with the sun.

The history of medicine reports innumerable instances in which curious minded doctors have combined all sorts of elements into preparations of various sorts in the administration and in the control of disease. No doubt each of the elements, such as copper and iron, has on occasion been combined with one or more of the others merely with a view to seeing what would happen and sometimes these, or worse combinations, have been put into the human body. Thus it is doubtful that the combination of any two well known elements may be considered a new procedure. Yet the question is raised as to whether or not the specific combination of two elements for a single apparently new purpose discovered by investigators in a laboratory does or does not constitute a discovery.

No doubt investigators long before the time of Drs. George F. and Gladys Henry Dick conceived the idea that the streptococcus was an important factor in scarlet fever and that products derived from the streptococcus might be used in the diagnosis, prevention and treatment of scarlet fever. Conceding that the Drs. Dick proved a certain streptococcus to be the cause of scarlet fever and developed thereby a method of diagnosis and means of determining susceptibility and methods for the prevention and treatment of scarlet fever based on their discovery, how far should they be entitled, under the patent granted them, to control research or other work with such products by other investigators? This has been a main bone of contention and quarrel for some years. Perhaps this difficulty may be credited to the fact that the administration and control of the patent lie with the discoverers themselves rather than with some wholly disinterested body capable of viewing the matter objectively.

When our civilization was such as to safeguard the physician, considering him as one who gave freely of his knowledge and service to mankind and therefore entitled to special considerations, physicians might well offer freely their time, their service and their original contributions to all mankind. Our complex civilization of today places ever new burdens on this willing bearer of mankind's tribulations. In many occasions and under many governments, physicians are now made employees of the state with some emolument and much control. Why should such a physician give freely to every one the product of his brain when the state refuses longer to recognize his professional status or to consider him as a philanthropic worker? It might be suggested that the state take over and control all patents in the field of health; but be reminded that the state has manifested no particular wisdom thus far in the granting of patents in the medical field. A patent was granted to Elisha Perkins for his electric tractors; to Sanche for that preposterous gas pipe called the Oxydonor. Patents have been issued covering flavoring of epsom salt, for a necklace supposed to cure goiter, for a tapeworm trap, for a method whereby the hen herself would date her eggs, for a shock-absorbing bed and for a combination of chemicals alleged to confirm immunity to most diseases, including syphilis, tuberculosis, diphtheria and other infectious diseases.

It would require a far finer organization of the patent office than now prevails to insure the public protection against fraud and exploitation with medical discoveries.

The act of securing a patent is not in itself unethical. Mere publication of a discovery does not protect the discoverer against exploitation of his patent by others. The administration of the patents covering insulin, liver extracts and many others has been shown to be for the public good. Manufacture has been standardized. Products of quality are provided for the public and, because of the protection, the prices of such products have been steadily reduced from the time when they were first offered to the people. It is doubtful that a high quality standardized product at a minimum price could have been made available nearly so soon had these preparations been thrown into the open market. Moreover, there is no question but that inferior products in vast numbers would also have been offered for general use. Finally, under our patent system, unless the discoverer or the university controls the patent, some one not bound by any ethical considerations whatever may patent the product and the process and thus take it away from those responsible for its discovery and development. The committee of the American Association for the Advancement of Science has suggested the desirability of patents in the medical field in order to encourage manufacturers in the development of high quality products at low prices, to recoup investigators for funds spent in research, and for the devotion of excess funds to further research.

CONCLUSION

In 1933 I concluded an editorial on the subject of medical patents with the following paragraph: "Conceivably the best interest would be served if some central body might be developed, wholly altruistic in character, capable of administering medical patents for the benefit of the public, and assuring a reasonable remuneration to the investigator, the devotion of much of the profit to research, and adequate return to manufacturers willing to develop quantity production and distribution in an ethical manner. Such a central body might also set up requirements for adequate clinical research in connection with the development of new products so that a premature launching of unestablished products on the medical profession or on the public could be avoided."

With that suggestion I still concur. It has seemed to me that the American Medical Association with its prestige, its central organization and its available funds might well stimulate the development of a corporation, not for profit, for the administration of patents in the medical and health fields. To this corporation inventors might assign the patents taken out by them with the understanding that the corporation would administer the patents within the limitations suggested and that the expenses of administration with suitable royalties to investigators, universities, research institutions or other bodies might be derived from the income available through licensing of well established firms to manufacture products under the patents.

The confusion of plans in the various universities, the vicious and sometimes malicious criticism of discoverers and of universities, the legal difficulties in which the universities sometimes find themselves and the basic principle enunciated in the Principles of Medical Ethics all seem to point toward the necessity of some unbiased body to assume responsibility and control in this field.

535 North Dearborn Street.

Council on Pharmacy and Chemistry

NEW AND NONOFFICIAL REMEDIES

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION.

PAUL NICHOLAS LEECH, Secretary.

SUPRARENALIN (See New and Nonofficial Remedies, 1937, p. 223).

The following additional dosage form has been accepted:

Suprarenalin Solution 1:100 (For Oral Inhalation): Suprarenalin, 1 part, in 100 parts of physiologic solution of sodium chloride containing 0.5 per cent chlorbutanol and not more than 0.1 per cent sodium bisulfide.

CEVITAMIC ACID (See New and Nonofficial Remedies, 1937, p. 456).

Cevitamic Acid-Lederle.—A brand of cevitamic acid-N. N. R., obtained from the fermentation of certain sugars.

Manufactured by Lederle Laboratories, Inc., Pearl River, N. Y. No U. S. patent or trademark.

Tablets Cevitamic Acid-Lederle, 0.01 Gm.
Tablets Cevitamic Acid-Lederle, 0.05 Gm.

POLLEN ANTIGENS-"National" (See New and Nonofficial Remedies, 1937, p. 39).

The following preparation is marketed in 5 and 15 cc. vial packages representing 25, 50, 100 and 250 units per cubic centimeter:

Mixed Grass Pollen Antigen-"National" (Timothy, 75 per cent; June Grass, Orchard Grass, Red Top, Rye, and Sweet Vernal Grass, each 5 per cent).

Manufactured by the National Drug Co., Philadelphia. No U. S. patent or trademark.

BISMUTH SUBSALICYLATE (See New and Nonofficial Remedies, 1937, p. 133).

Bismuth Subsalicylate in Oil-2 grains per cc.: A suspension containing 2 grains of Merck's bismuth subsalicylate in 1 cc. oil of sesame.

Prepared by the National Biological Distributors, Inc., Baltimore. No U. S. patent or trademark.

IPRAL SODIUM (See New and Nonofficial Remedies, 1937, p. 106).

The following dosage form has been accepted:

Elixir Ipral Sodium: Contains ipral sodium 13.17 Gm. in 1,000 cc. in a menstruum composed of alcohol 22 per cent, glycerin, saccharin and water, flavored with a mixture of pineapple concentrate, orange syrup, fluidextract of kola, fluidextract of cascara, and tincture of cardamom compound. One teaspoonful (5 cc.) is equivalent to 1 grain of ipral sodium.

PROCAINE-ABBOTT See New and Nonofficial Remedies, 1937, p. 69).

The following dosage form has been accepted:

Ampoules Procaine Hydrochloride Solution 2%, 100 cc.: Each cubic centimeter contains procaine hydrochloride 0.02 Gm., sodium chloride 0.0044 Gm., sodium bisulfite 0.001 Gm., and distilled water to make 1 cc.

SULFANILAMIDE (See THE JOURNAL, July 31, 1937, p. 358; Supplement to New and Nonofficial Remedies, 1937, p. 17).

Sulfanilamide-Gane & Ingram.—A brand of sulfanilamide-N. N. R.

Manufactured by Gane Chemical Works, Inc. (Gane & Ingram, Inc., distributors). No U. S. patent or trademark.

Sulfanilamide-Monsanto.—A brand of sulfanilamide-N. N. R.

Manufactured by Monsanto Chemical Co., St. Louis. No U. S. patent or trademark.

Sulfanilamide-"National."—A brand of sulfanilamide-N. N. R.

Manufactured by the National Drug Co., Philadelphia. No U. S. patent or trademark.

Sulfanilamide Tablets, 5 grains.

Sulfanilamide-P. D. & Co.—A brand of sulfanilamide-N. N. R.

Manufactured by Parke, Davis & Co., Detroit. No U. S. patent or trademark.

Sulfanilamide Tablets, 5 grains.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

535 North Dearborn Street . . . Chicago, Ill.

Cable Address . . . . "Medic, Chicago"

Subscription price . . . . . Seven dollars per annum in advance

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SATURDAY, NOVEMBER 6, 1937

DEATHS FOLLOWING ELIXIR OF SULFANILAMIDE-MASSENGILL: III

Thirty-five years ago William Osler wrote:

To modern pharmacy we owe much and to pharmaceutical methods we shall owe much more in the future, but the [medical] profession has no more insidious foe than the large borderland pharmaceutical houses. No longer an honored messmate, pharmacy in this form threatens to become a huge parasite, eating the vitals of the body medical. We all know only too well the bastard literature which floods the mail, every page of which illustrates the truth of the axiom The greater the ignorance the greater the dogmatism. Much of it is advertisements of nostrums foisted on the profession by men who trade on the innocent credulity of the regular physician, quite as much as any quack preys on the gullible public. Even the most respectable houses are not free from this sin of arrogance and of ignorant dogmatism in their literature. A still more dangerous enemy to the mental virility of the general practitioner is the "drummer" of the drug house.[1]

During the intervening years the work of the Council on Pharmacy and Chemistry has brought about vast improvement among leaders in the pharmaceutical field. Unfortunately many smaller and unenlightened groups of pharmacists and pharmaceutical manufacturers fail to recognize the importance of high standards in all the professions concerned with health. It is still possible for such manufacturers to place on the market semisecret preparations, untested as to either toxicity, potency or therapeutic value.

Sixty deaths are known to have resulted from the administration of the Elixir of Sulfanilamide distributed by Massengill. Under our present laws the responsibility for protection of the public rests on the Food and Drug Administration, which is as inefficiently armed as a hunter pursuing a tiger with a fly swatter. Under our present laws there is nothing to require the S. E. Massengill Company or any other firm to divulge the formula or to make adequate pharmacologic or clinical tests before placing a hazardous "patent medicine" or proprietary preparation on the market. Ironically the label for Elixir of Sulfanilamide-Massengill carried the recommendation "continue at this dose until recovery"! In reply to a question by a physician who had lost a patient after having prescribed the mixture, a letter bearing the signature S. E. Massengill was sent:

"We have your letter of the 22nd instant and regret very deeply the fatal result that you had when administering the above product. We are sorry that we cannot give you any information as to why this should have happened. Many chemists are now working on the problem and so far no solution of a scientific nature has been made.

"We regret exceedingly this unfortunate occurrence, but as we violated no law and made no error in our manufacture, I do not think that we should be blamed by the unlooked for action of this product."

Thus speaks a firm which has done essentially nothing to contribute to the knowledge of medicine and which would capitalize on the discoveries of others, by exploiting a semisecret preparation! Who should have made certain of the safety of the preparation if not the purveyor? In the cycle comes first the manufacturer who launched the preparation without proper precaution; second, the detail man who importuned physicians to use the product; third, the pharmacist who was willing to sell across the counter, either on request from the public or on physicians' prescriptions, toxic preparations of secret character, yet whose training is vaunted as a protection to the public. But most serious perhaps after the manufacturer are those physicians who will not heed the warnings concerning the use of proprietary, unstandardized, semisecret remedies. This phase has been adequately discussed editorially in the two previous issues of The Journal.

Perhaps the physicians who used this product were misled by the term "Elixir." In general that term has connoted sweetened, aromatic, hydro-alcoholic liquids similar to cordials, to which active drugs are added. This definition, however, has undergone some changes in the practice of pharmacy by the employment of other solvents, such as glycerin. There is no legal definition of the term "Elixir." The U. S. Pharmacopeial Revision Committee or some group with legal power should define "Elixir" and similar terms.

As has been cautioned repeatedly, sulfanilamide should not be used with other drugs except sodium bicarbonate. It decomposes in ordinary vehicles. In the case of the diethylene glycol vehicle devised by Massengill, the product did not decompose but the patients did die.

Elsewhere[2] in this issue of The Journal is an extended report on the chemical composition of the product, on the pharmacologic[3] work following the administration of Elixir of Sulfanilamide-Massengill to animals, and on the studies of necropsy material from

1. Excerpt from lecture "Chauvinism in Medicine" given before the Canadian Medical Association, Montreal, 1902, and from the book "Acquanimitas and Other Addresses" by William Osler, Philadelphia, P. Blakiston's Son & Co., 1906, p. 300.

2. This issue p. 1531.

3. The reports of Dr. Geiling and Dr. Cannon are necessarily epitomized. Details and reports of observations on the action of sulfanilamide may be the subject of future contributions to the scientific literature.

both animals and man. These studies have been under way day and night since the middle of October. The chemical analysis shows that the product contained approximately 72 per cent of diethylene glycol by volume. The pharmacologic investigations show that there is no essential difference in the results whether Elixir of Sulfanilamide-Massengill in the doses recommended or comparable doses of a "synthetic" mixture or of diethylene glycol are administered. The pathologic examinations reveal that the picture of death is similar in human and animal necropsy material. The terminal symptom in all the instances recorded was anuria.

Sixty persons have been sacrificed simply because the toxicologic observations now reported were not determined in advance by a manufacturer who had no hesitancy in importuning physicians to use the elixir. Both chemical and medical literature contain references to the toxicity of diethylene glycol in the amounts recommended by the manufacturer. Diethylene glycol, administered in doses comparable to the dose recommended by the manufacturer of Elixir of Sulfanilamide-Massengill, acts as a cumulative poison. Surely there has been no blacker picture of the inadequacy of our present food and drug laws or the lack of common scientific decency in drug manufacture than that illustrated by this tragic disaster.

ANTIDIURETIC HORMONE OF THE POSTERIOR PITUITARY

In 1895 Oliver and Schafer first demonstrated the action of posterior pituitary extracts on the vascular system. Since then preparations have been made which are suitable for clinical use, but the hormone or hormones of the posterior pituitary have not been isolated in chemically pure form. Some of the problems of the posterior pituitary must await the identification in chemically pure form of the "mother" substance of Abel,[1] its fractional derivatives or separate fractions.[2] The physiologic investigations of this gland have already far outstripped chemical studies. It seems likely, therefore, that chemical purification will merely settle the controversy that has existed as to whether a single hormone is responsible for the diverse physiologic actions of the posterior pituitary or whether at least three or more active principles exist as such and are transported as separate entities in the blood stream.

Not the least striking of the properties of posterior lobe extracts is their antidiuretic activity. The site of this action has been the subject of considerable experimentation and debate. It is generally accepted that in man, at least, the effect of therapeutic doses of pituitary extract is due to an increased water reabsorption in the renal tubule. The kidney appears, therefore, to be under the hormonic control of the pituitary gland with respect to reabsorption of fluid from tubular activity. However, conclusive evidence for the true hormonic nature of the antidiuretic principle has been lacking. When account is taken of the exactness with which the degree of body hydration is maintained, it seems likely that the relationship between the gland and the kidney must be a readily adjustable one and therefore probably under hormonic control. This assumption presupposes that the body requirements for water absorption in the kidney will to a large measure determine the degree of hypophysial activity in the production of the antidiuretic hormone. Convincing proof of this postulate has been recently presented by Gilman and Goodman,[3] working in the laboratories of the Yale University School of Medicine.

The relative stability of pituitary extracts in urine suggested to these investigators that the antidiuretic hormone might be demonstrated in this body fluid whenever it was necessary for the organism to conserve water. Under such conditions the blood concentration of the hormone might rise to levels exceeding the renal threshold, thus permitting the substance to pass into the urine. They produced this physiologic need for the conservation of water in rats that were dehydrated by either water and food withdrawal or by oral administration of sodium chloride. Suitably concentrated and dialyzed urines from these animals showed, on bio-assay, marked antidiuretic activity. Control animals, given water ad libitum, showed no urinary excretion of the antidiuretic hormone. Experiments were also conducted on hypophysectomized animals. This group of animals, from seven to fourteen days after operation, was deprived of all water during the period of urine collection and normal control animals were dehydrated at the same time under identical experimental conditions. The volume of urine from the hypophysectomized group of rats was approximately three times greater than that from the controls. It is evident, therefore, that the experimental animals were more dehydrated than the control group and had a greater stimulus for water conservation. Despite this need, however, assay demonstrated that the urine of the hypophysectomized rats contained no antidiuretic substance, while the control urine exhibited unmistakable antidiuretic activity. Thus it would appear that the pituitary gland is definitely the source of the antidiuretic substance in the urine. Further proof of the hypophysial origin of the antidiuretic principle of the urine was obtained by the demonstration of a similarity between the chemical properties of pharmacologic preparations from the gland and the urinary principle. The results offer definite evidence for the hormonic rôle of the antidiuretic principle.

1. Abel, J. J.: J. Pharmacol. & Exper. Therap. **40**: 139 (Oct.) 1930.
2. Kamm, O., and others: J. Am. Chem. Soc. **50**: 573, 1928.
3. Gilman, Alfred, and Goodman, Louis: J. Physiol. **90**: 113 (July) 1937.

FOOD AND DRUGS LEGISLATION

The unnecessary deaths of more than sixty people who took a pharmaceutical preparation labeled "elixir of sulfanilamide," secret in composition and unstandardized, emphasizes again the importance of securing as soon as possible adequate legislation relating to foods, drugs, diagnostic and therapeutic devices and cosmetics. Either by amendment of present food and drugs laws or by the passage of new laws the public must be protected. The Food and Drugs Act of 1906, as pointed out in the special article on this subject by our Bureau of Legal Medicine and Legislation, published elsewhere in this issue, fails in various ways to protect the consumer. It does not provide adequate standards of purity, potency, wholesomeness and labeling of foods and drugs, nor does it provide for suitable penalties when foods and drugs fail to meet such standards as it does establish. It provides no standards for diagnostic and therapeutic devices or for cosmetics. Moreover, the many loopholes in this legislation make evasion easy for those who wish to evade. Finally, that legislation was passed at a time when modern advertising was in its infancy; it provides no potent weapon against false or fraudulent advertising of foods, drugs, devices or cosmetics.

The proposed legislation, introduced into Congress beginning with the Tugwell-Copeland bill of the Seventy-Third Congress and passing through various phases in the Seventy-Fourth and the Seventy-Fifth Congress, is not adequate. From a legal point of view it seems weak in many particulars. One of the greatest weaknesses is the failure to set up adequate legal standards for drugs and diagnostic and therapeutic devices or to establish machinery by which such standards can be established. Had there been such standards, with adequate penalties for violation, the elixir of sulfanilamide tragedies would probably never have occurred. Indeed, as was emphasized in our editorial last week, present legislation is so inefficient that the Food and Drug Administration had to act by a special technical interpretation of the present law.

The Wheeler-Lea bill proposes to vest in the Federal Trade Commission supervision and control over the advertising of foods, drugs, diagnostic and therapeutic devices and cosmetics, leaving to the Food and Drug Administration supervision and control over their adulteration and misbranding. Under such an arrangement there will be not only duplication of effort but also conflict of interest from which the chief sufferer will unquestionably be the public, which is in need of protection. Division of authority and responsibility for the enforcement of food, drug and cosmetic legislation is dangerous. If the Wheeler-Lea bill is to be passed, certainly it should be amended to prevent such division of responsibility between the Federal Trade Commission and the Food and Drug Administration of the Department of Agriculture as would inevitably arise under the bill as now written.

The Copeland bill now pending before the Committee on Interstate and Foreign Commerce of the House of Representatives is a much better planned bill as far as effective protection of the consumer is concerned. The advertising provision and those relating to standards in the Copeland bill may well be strengthened. If it is impossible to pass the Copeland bill, and if the desires of the Administration and of the Congress are for passage of the Wheeler-Lea bill, Congress should well consider the advisability of placing all the responsibility on the Federal Trade Commission rather than dividing it. In such action, however, it should bear in mind that the Food and Drug Administration has had many years of actual experience in enforcing food and drugs legislation. Most important, however, is adequate provision for establishment of obligatory legal standards for drugs and other materials used in the human body. Until such standards are created and until the penalties for violation are made sufficiently severe, there will be possible disasters such as the deaths from elixir of sulfanilamide, which for more than a fortnight have continued to shock the nation.

Current Comment

CANADA CLEANS UP THE RADIO

The Canadian Broadcasting Corporation has promulgated regulations, effective November 1, designed to improve the standard of broadcasting. Among them are some regulations that should react to the betterment of the public health. Hereafter an article marketed under the Proprietary or Patent Medicine Act or the Food and Drugs Act may not be broadcast until it has been approved by the Department of National Health. The formula for any article bearing a distinctive or trade name distinguishing it from any other product, and marketed under the Food and Drugs Act, shall be submitted with each pertinent continuity at least two weeks in advance of the time at which the continuity is to be broadcast. No continuity recommending any treatment for any ailment shall be broadcast until it has been approved by the Department of National Health. No station shall "pick up" and rebroadcast any program unless permission in writing has first been obtained from the Canadian Broadcasting Corporation. Hereafter, no one shall broadcast advertising matter that contains false or deceptive statements. No one shall broadcast on the subject of birth control or on the subject of venereal disease or other subjects relating to public health unless such subjects are presented in a manner and at a time approved by the general manager as appropriate to the medium of broadcasting. No one shall broadcast programs presenting a person who claims supernatural or psychic powers, or fortune teller, character analyst, crystal gazer or the like. No program shall be broadcast in which a person purports to answer or solve problems submitted by the public unless such programs first shall have been approved in

writing by a representative of the Canadian Broadcasting Corporation. No one shall broadcast over the Canadian radio facilities the actual proceedings of any trial in a Canadian court or any abusive comment on any race, religion or creed. No one shall broadcast any advertising matter containing false or deceptive statements, and the advertising content of any program shall not exceed 10 per cent of the time of any program period. No one shall advertise spirituous liquors in any broadcast program. So-called spot announcements shall be limited to two minutes for each broadcasting hour and shall not be broadcast between 7:30 p. m. and 11 p. m. nor on Sundays at any time. No broadcasting station in Canada shall continue to be a part of a chain or network originating outside of Canada unless permission in writing is first obtained from the Canadian Broadcasting Corporation; also unless such permission is granted, no chain or network of two or more stations shall continue to be operated within Canada, and no station shall continue to be an outlet for any station, chain or network outside of Canada. There are many other new Canadian broadcasting regulations which, however, do not so directly affect the public health. Thus we shall receive from our northern neighbor radio broadcasts of purity in contradistinction to the quackery, fortune teller and "patent medicine" promotion that comes floating like a foul effluvium across the Rio Grande. The new Canadian broadcasting regulations may also serve as a suggestion much needed by our own broadcasting chains.

PASSIVE IMMUNITY IN MALARIA

Although it has been generally accepted that some immunity exists on recovery from malarial infections, reports in the literature on the protective property of serum taken from patients or animals with chronic malaria have been conflicting. Recently, however, Coggeshall and Kumm[1] reported a series of experiments on monkeys, employing two different types of parasites, which appear to demonstrate this phenomenon conclusively. The two strains used were Plasmodium knowlesi and Plasmodium inui. Macacus rhesus monkeys were used exclusively in the experiments and were infected by intravenous injection of citrated blood containing a known number of parasites.

Thirty-two animals were used in the observations in eight groups of experiments devised to test various aspects of passive immunity. The results seem to indicate that while the immune serum obtained from monkeys with chronic malarial infections definitely afforded good protection in some animals into which it was injected, it completely failed in others. These authors offer no adequate explanation for this circumstance but suggest that in addition to individual variation in the susceptibility of the monkeys there may be considerable variability in the concentration of the immune substances of the serum of the individual monkeys harboring a chronic infection from which the pooled serum was obtained. They concluded that when Plasmodium knowlesi infection, which is almost invariably fatal in rhesus monkeys, can be made chronic by the early administration of antimalarial drugs, the animals then will harbor chronic infection for an indefinite period. The serum from such monkeys when injected into others with an acute attack has been found to have a definite inhibiting effect on the course of the experimental disease. These data indicate that protective antibodies are produced in the serum of monkeys during experimental malarial infection and can be demonstrated by animal protection experiments. The clinical applications, if any, however, cannot be ascertained as yet.

1. Coggeshall, L. T., and Kumm, H. W.: Demonstration of Passive Immunity in Experimental Monkey Malaria, J. Exper. Med. **66**: 177 (Aug.) 1937.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

ARIZONA

Hospital News.—A new $48,000 hospital has been opened in Yuma County, with facilities for seventy-nine patients.

Society News.—Dr. Leslie M. Smith, El Paso, Texas, addressed the Cochise County Medical Society, Bisbee, recently on "Fungus Infections of the Southwest."

COLORADO

Personal.—A portrait of the late Dr. Samuel D. Gross, Philadelphia, was recently presented to the library of the Medical Society of the City and County of Denver by Dr. William M. Bane. The portrait is done in charcoal and is the work of Dr. Bane's father, the late Dr. William C. Bane, for many years a member of the faculty of the Denver and Gross Medical College.

DELAWARE

State Medical Election.—Dr. Clarence J. Prickett, Smyrna, was chosen president-elect of the Medical Society of Delaware at the recent annual meeting. Dr. Charles P. White, Wilmington, is president for the coming year. Dr. Allan V. Gilliland, Smyrna, has been elected secretary, succeeding Dr. William H. Speer, Wilmington. The new officers will take office January 1. The next annual meeting will be held in Dover, Oct. 10-12, 1938.

Society News.—Dr. Thomas Grier Miller, Philadelphia, addressed the New Castle County Medical Society, October 19, in Wilmington, on "Indigestion." Dr. Hugh H. Young, Baltimore, addressed the society, September 21, on "Diseases of the Prostate Gland."——Dr. Lewis Kraeer Ferguson, Philadelphia, discussed "Practical Points in Treatment of Surgical Lesions in Ambulatory Patients," November 1, before the Delaware Academy of Medicine, Wilmington.

FLORIDA

Personal.—Dr. William M. Weems, formerly of Clopton, Ala., has been appointed health officer of Palm Beach County. ——Dr. Alvin L. Stebbins, Punta Gorda, has been appointed health officer of Manatee County.

First Annual District Meeting.—The first annual meeting of the Southwest Medical District of the Florida Medical Association will be held at the City Hall, Plant City, November 11. Dr. George L. Cook, Tampa, president, Hillsborough County Medical Society, will deliver the address of welcome. Other speakers will be:

Dr. Douglas D. Martin, Tampa, Appendicitis in Children.
Dr. Shaler A. Richardson, Jacksonville, Quinine Amblyopia.
Dr. Herman W. Watson, Lakeland, Disturbances of the Thyroid Function.

GEORGIA

Personal.—Dr. Thomas W. Collier, formerly of Albany, has been appointed health commissioner of a joint health unit for Toombs and Montgomery counties; his headquarters will be in Lyons.

IDAHO

Personal. — Dr. James O. Cromwell, Gooding, has been appointed in charge of the state mental hospital at Blackfoot. Dr. Luther C. Thompson, formerly with the Civilian Conservation Corps, will succeed Dr. Cromwell in Gooding, according to *Northwest Medicine.*

ILLINOIS

Survey of Medical Services of Prisons.—The report on a survey of medical services in the penal institutions of Illinois made by a special committee under the auspices of the Institute of Medicine of Chicago has been published. The report is concerned primarily with determining requirements for a modern medical program as adapted to the institutions studied. The medical services of the federal penitentiary system were used as a basis of comparison. Since 1930, when the federal system for this care was reorganized, these services have been under the supervision of the U. S. Public Health Service. Prior to the reorganization, the medical services, including the setting of standards, were left to the local administration of each prison. In its study the committee compared the medical personnel and the quantity of medical service rendered to the male inmates of federal prisons and those in the Illinois state prisons. For comparable average populations of about 10,000 in each case, the federal system has a total of forty-nine physicians, including twenty-four resident full time and twenty-five nonresident, part time, in attendance. Illinois has five resident full time physicians, including three psychiatrists, and eight nonresident part time physicians, a total of thirteen, exclusive of the services of two interns during the summer. The federal system reports 174,812 days of hospital care and 421,128 visits of ambulatory patients to the medical services, while Illinois reports 54,004 days of hospital care and 143,994 visits of ambulatory patients. The report states that these figures "reflect the difference between the services the institutions are called upon to perform when the initiative is left largely to the individual prisoner, as is the case in Illinois, and when the medical service itself takes the initiative in finding and following up conditions which may be benefited by treatment, as is the case in the federal system." The study reveals that the state's medical services are being carried on as they were in the federal institutions previous to 1930 and concludes "that the medical services display a type of organization, or lack of organization, suitable to a generation or more ago, when these services were presumably instituted. While they function as well as may be expected under these conditions, they fall far short of the requirements for the modern, aggressive health service now regarded as essential for large populations under similar conditions."

Chief among the committee's recommendations is the reorganization of the general medical and surgical services on a state-wide basis, under the supervision of a physician to be attached to the department of public welfare, with responsibility for the setting of standards and for the selection of medical personnel. The committee also recommends installation of a graded personnel, making the service attractive as a medical career and a considerable increase in the total medical personnel. Specific recommendations are made for the control and treatment of tuberculosis and venereal disease, and a plan is proposed for improving the quality of major surgery. The committee points out that Illinois has been a pioneer in the organization of a modern psychiatric service and recommends no change in this service, although it urges an increase in personnel. It estimates that all of its recommendations can be carried out at an added cost of not to exceed three cents a day for each individual in the prison population. The salary schedule for 1936 for the general medical and surgical services totaled $17,880, while the proposed increase in a reorganized service calls for an additional $44,000. The committee estimates that the ultimate cost of a complete and comprehensive reorganization should not exceed $100,000 annually. The institutions studied were those at Joliet, Menard, Pontiac, Vandalia and Dwight. Members of the committee, which was appointed Nov. 13, 1935, comprised Drs. Franz G. Alexander, Clarence F. G. Brown, Walter M. Brunet, Francis J. Gerty, Jerome R. Head, Don C. Sutton, Franklin C. McLean, Chicago, chairman, and Frank L. Rector, Evanston.

Chicago

Changes in the Faculty at Loyola.—Recent changes on the faculty at Loyola University School of Medicine include the appointment of Dr. William R. Cubbins as professor and director of a new division of bone and joint surgery; Julius Sendroy Jr., Ph.D., as professor and head of a new department of experimental medicine, and the appointment of Dr. Henry Schmitz, head of the department of gynecology, as head of the department of obstetrics to succeed Dr. Bertha Van Hoosen, who becomes professor emeritus. Other changes include:

Dr. Thomas F. Finegan, professor of urology.
Dr. Robert E. Cummings, assistant clinical professor in pediatrics.
Dr. H. William Elghammer, clinical professor of pediatrics.
Dr. William J. Pickett, associate clinical professor of surgery.

Society News. — The Chicago Gynecological Society was addressed, October 22, by Drs. Franklin E. Hall on "Inversio Uteri" and James E. Fitzgerald on "Hyperemesis Gravidarum." —— The Chicago Ophthalmological Society was addressed, October 25, by Drs. William F. Moncreiff on "Contact Lenses: A New Technic for Making Impressions of the Anterior Segment"; James W. White, New York, "The Occurrence of Divergence Excess Associated with Vertical Anomalies," and Theodore L. Terry, Boston, "Concerning the Pathology of Glaucoma."——At a meeting of the Chicago branch of the American Chemical Society, September 24, Dr. Leon Unger and Marjorie Moore, Ph.D., discussed "Cooperative Studies on Hay Fever and Other Allergic Conditions."——The Chicago Society of Internal Medicine will be addressed November 22, among others, by Dr. Harold C. Lueth and Thrift G. Hanks on "Some Unusual Reactions to Nitroglycerin in Patients with Hypertension."——Dr. Walter E. Dandy, adjunct professor of neurologic surgery, Johns Hopkins University School of Medicine, Baltimore, addressed the Englewood branch of the Chicago Medical Society, November 2, on "Diagnosis and Treatment of Lesions of the Cranial Nerves." The Irving Park branch was addressed November 2 by Drs. Archibald L. Hoyne on "The Later Stages of Poliomyelitis: Treatment and Prognosis," and Fremont A. Chandler, "Orthopedic Management." Poliomyelitis was also discussed at the meeting of the South Chicago branch October 26; the speakers were Drs. Sidney O. Levinson and H. William Elghammer.

IOWA

Another County Health Unit Organized. — The Polk County Health Unit was organized August 18. The new unit will not function in or serve the city of Des Moines but the personnel of the unit will cooperate with the city's health commissioner, Dr. Harry E. Ransom, in borderline public health conditions affecting both city and county. The state will maintain the department. Dr. Thomas E. Eyres is health officer of the new unit with headquarters in the City Hall at Des Moines.

Health Lectures for High School Students.—The second annual course in public health for all high school students in Crawford County, under the auspices of the Crawford County Medical Society, began September 20. Lectures arranged by the association will be given periodically in nine schools during the school year. The course is planned as an annual project so that after the first four years graduating students will have had thirty-six hours of public health lectures. The program this year is as follows:

Dr. Ralph E. Haskell, Denison, Infection Resulting from Injuries.
Dr. Simon A. Huber, Charter Oak, Diseases and Care of the Ear, Nose and Throat.
Dr. Eugene J. Maire, Vail, Venereal Diseases.
Dr. Edward M. Mark, Manilla, Diseases and Care of the Skin.
Dr. Frank N. Rowe, Denison, Diseases, Defects and Care of the Eyes.
Dr. Claudius L. Sievers, Denison, The Care of the Heart.
Dr. Thomas L. Vineyard, Dow City, Tuberculosis in High School Age.
Dr. Dora E. Kielhorn Zarske, Charter Oak, Infectious Diseases of the Respiratory Tract Other Than Tuberculosis.
Dr. John James Duffy, Denison, Epidemic Infections of the Central Nervous System (Infantile Paralysis and Spinal Meningitis).

KANSAS

Society News.—Dr. Lester R. Dragstedt, Chicago, discussed "The Etiology of Gastric and Duodenal Ulcer" before the Kansas City Academy of Medicine, October 15.——Drs. Karl A. Menninger and Norman Reider, Topeka, addressed a joint meeting of the Marion, McPherson and Harvey county medical societies at Marion, October 27; their subjects were "The Psychoneurotic and the General Practitioner" and "Headaches" respectively.——Dr. Ernest E. Tippin, Wichita, addressed the Marion County Medical Society, September 29, on "Physiology of the Nose."

KENTUCKY

Personal.—Dr. Henry G. Wells, Richmond, has resigned as health officer of Madison County.——Dr. William A. Krieger, Newport, has been appointed city health officer to succeed Dr. John Todd.

Society News.—A symposium on traumatic surgery was presented before the Jefferson County Medical Society, Louisville, October 18, by Drs. Ira N. Kerns, Robertson O. Joplin,

James Allen Kirk and Herman Mahaffey. Dr. Joshua B. Lukins also made an address on malpractice.——Drs. William Austin Bloch and Max L. Garon, Louisville, addressed the Grant County Medical Society, Williamstown, September 22, on "Deficiencies of the Thyroid." Dr. R. Hayes Davis, Louisville, spoke at a recent meeting on "Functional Diseases." ——Dr. Lucius E. Smith, Louisville, addressed the Letcher County Medical Society, Jenkins, September 21, on tuberculosis.

LOUISIANA

Personal.—Dr. James W. Tedder has been appointed assistant professor of dermatology at the Louisiana University Medical Center.——Dr. Herbert N. Barnett, New Orleans, has been appointed acting health director of Bossier Parish, succeeding Dr. Murphy M. Sims, Benton, who resigned to enter private practice in Waskom, Texas.

Society News.—At the meeting of the Orleans Parish Medical Society, October 11, the speakers included Drs. William H. Perkins, professor of preventive medicine, Tulane University of Louisiana School of Medicine, New Orleans, on "Relation of Preventive Medicine to the Federal and State Welfare Program," and Elizabeth Wisner, Ph.D., dean, school of social work at Tulane, "Some Phases of the Social Security Act."——At a meeting of the Tri-Parish Medical Society in Lake Providence, September 7, Drs. John H. Burge, Lake Village, Ark., discussed "Infections of the Hands and Feet," and Smith W. Douglas, Eudora, Ark., "Medical Fads and Fallacies."

MARYLAND

Fund for Educational Purposes.—A foundation endowed with $500,000 will be created for charitable, educational or research purposes, under the will of the late Louis Blaustein, Baltimore. It will be known as the Louis and Henrietta Blaustein Foundation. The income from the fund may be used or its principal; it may go for medical or sociological research, education, recreation or any other benevolent purpose; it may be spent in Baltimore or elsewhere.

MASSACHUSETTS

Society News.—Dr. Soma Weiss, associate professor of medicine, Harvard University Medical School, Boston, addressed the opening meeting of the South End Medical Club, October 19, on "Syncope, Collapse and Shock."——At a meeting of the Norfolk District Medical Society in Boston, October 26, Dr. William Dameshek, Boston, discussed "Leukemia and Related Disorders."——Dr. George S. Sprague, White Plains, N. Y., discussed "The Rationale of Psychiatric Therapy" before the New England Society of Psychiatry in Westborough, October 19.——At a meeting of the New England Heart Association and the Suffolk District Medical Society, October 25, Dr. Milton C. Winternitz, New Haven, Conn., spoke on "Pathology of Vascular Diseases."——The Boston Society of Psychiatry and Neurology was addressed, October 21, by Drs. Leon J. Robinson, Palmer, on "Syncope, Convulsions and the Unconscious State: Their Relationship to the Hyperactive Carotid Sinus Reflex Among 1,000 Patients in an Institution for Epilepsy," and Calvert Stein, "Practical Aspects of Child Guidance—A Critical Analysis of 500 Cases from the Springfield Hospital Child Guidance Clinic."——At a meeting of the Harvard Medical Society in the Peter Bent Brigham Hospital, Boston, October 26, Drs. William G. Lennox and Frederic A. Gibbs discussed "Epilepsy in the Light of Recent Brain-Wave Studies."

Control of Hazardous Dusts and Fumes.—The following committee has been appointed to assist the state department of labor and industries in the preparation of rules and regulations for the control of hazardous dusts and fumes in the manufacturing establishments of the state:

Dr. Joseph C. Aub of the Collis P. Huntington Memorial Hospital.
E. H. Ballard, general foundry superintendent, General Electric Company.
John Daniels, legislative agent, Associated Industries of Massachusetts.
Philip Drinker, C.E., professor of industrial hygiene, Harvard School of Public Health.
Laurence Foley, international president, Granite Cutters International Association of America.
Dr. Francis T. Hunter of the Massachusetts General Hospital.
William M. Rand, president, Merrimac Chemical Company.
Robert J. Watt, secretary-treasurer, Massachusetts Federation of Labor.
Stephen E. Whiting, chief engineer, Liberty Mutual Insurance Company.

According to Manfred Bowditch, director, division of occupational hygiene, the committee is studying the establishment of maximum allowable concentrations of industrial fumes. As a basis for the determinations it is using a tabulation in which all standards known thus far to have been promulgated are combined with tentative figures proposed by the division of occupational hygiene and in addition it has obtained the criticisms of twenty-two authorities in this country and abroad to whom these figures were submitted.

MICHIGAN

State Medical Election.—Dr. Henry A. Luce, Detroit, was chosen president-elect of the Michigan State Medical Society at its annual meeting in Grand Rapids, September 27-30, and Dr. Henry Cook, Flint, was installed as president. The seventy-third annual meeting of the society will be held in Detroit Sept. 19-22, 1938.

Society News.—Dr. Carey P. McCord, Detroit, addressed the Kent County Medical Society in Grand Rapids, October 13, on occupational diseases.——The West Side Medical Society, Detroit, was addressed, October 7, among others, by Drs. Ernest H. Watson on "Current Status of Sulfanilamide Therapy," and John H. Cobane, "Treatment of Seborrheic Dermatitis and Epidermophytosis."——Dr. Frederic Schreiber, Detroit, discussed "Cerebral Anoxemia" before the Wayne County Medical Society, Detroit, October 18.——Dr. Charles Leslie Mitchell, Detroit, discussed "Back Pain" before the Washtenaw County Medical Society in Ann Arbor, October 12. ——Dr. Louis H. Newburgh, Ann Arbor, addressed the Kalamazoo Academy of Medicine, October 19, on "Nature and Management of Nephritic Edema."

Personal.—Dr. John C. Bugher, assistant professor of pathology, University of Michigan Medical School, Ann Arbor, has resigned to join the staff of the Rockefeller Institute for Medical Research, New York. He will be engaged in research at the institute until January, when he will sail for Bogota, Colombia, to study yellow fever.——Dr. George A. Kamperman, formerly professor of gynecology, Wayne University College of Medicine, Detroit, was awarded the honorary degree of master of science at the opening exercises of the eighty-eighth session of the University of Michigan Medical School. The Sternberg Medal, awarded annually to the student with the best record in preventive medicine, was presented to Dr. Carl A. Moyer, an intern in the department of surgery. ——Dr. Martin A. Mortensen, Battle Creek, was guest of honor at a farewell dinner, October 5, given by the Calhoun County Medical Society. He is leaving Battle Creek to live in California. Dr. Stanley Gibson, associate professor of pediatrics, Northwestern University Medical School, Chicago, addressed the meeting on "Diagnosis and Abdominal Conditions in Children."——Dr. Edwin H. Place, Burlington, Iowa, has been appointed health officer for Midland County, succeeding Dr. Leslie V. Burkett, Midland, who has accepted a similar position in Genesee County.

MISSISSIPPI

Community Hospital Opened in Tupelo.—The North Mississippi Community Hospital was opened at Tupelo October 3. This fifty-bed hospital is the eighth built as part of a special project of the Commonwealth Fund of New York, which is now undertaking to provide one new hospital each year for a predominantly rural community which will agree to meet its share of costs and to run the institution in accordance with generally accepted standards. The ninth hospital is now under construction at Ada, Okla., and the tenth has been awarded to the community centering in Provo, Utah. The fund began this project in 1926 as an experiment in meeting the need of rural communities for better medical and other health services. The present plan is to aid in establishing hospitals of between twenty-five and fifty beds, easily accessible to a rural community having a population large enough to make good use of such accommodations and capable of meeting operating costs. The hospital may either be a totally new institution or may replace existing facilities which are clearly inadequate. The fund furnishes plans, specifications and architectural supervision for the construction and not less than $200,000 as a contribution toward capital costs. Communities needing a fifty bed hospital are required to raise from $40,000 to $60,000 for their share of the capital cost and must provide in addition a site (with service connections) and from $10,000 to $15,000 to meet the deficit of the first year's operation. Ownership and administrative responsibility are lodged in a local corporation, organized not for profit, which contracts with the fund to operate the hospital in agreement with specified standards. Hospitals founded under this program are now

operating in Murfreesboro, Tenn.; Farmville, Va.; Glasgow, Ky.; Farmington, Maine; Wauseon, Ohio; Beloit, Kan., and Kingsport, Tenn.

MISSOURI

Society News.—Dr. Karl A. Menninger, Topeka, addressed the Jasper County Medical Society in Joplin, October 12, on "The Emotional Factors of Hypertension."——A clinic on arthritis was presented before the St. Louis Medical Society, October 26, by Drs. Ralph A. Kinsella, James Archer O'Reilly and Raymond O. Muether.

NEW JERSEY

Cancer Week in Passaic County.—During the week of October 11 the Passaic County Medical Society sponsored a "Cancer Week" in Paterson. Two evening symposiums for the medical profession were presented: one on cancer of the stomach by Drs. Fred W. Stewart, George T. Pack and Ralph E. Herendeen, New York; the other on cancer of the colon by Drs. Paul Klemperer, New York, and Frank H. Lahey, Boston. Dr. Frank E. Adair, New York, lectured to the public one evening. Round table discussions were held each afternoon, led by Drs. Louis G. Shapiro, Norman M. Dingman and William Spickers. There were also exhibits both for the physicians and for the public, including motion pictures.

Society News.—At a meeting of the Essex County Medical Society, Newark, October 14, the speakers were Dr. Chester R. Brown, Kearney, on "Child Welfare"; Dr. Richard H. Dieffenbach, "Empyema," and Clara H. Krauter, principal of the Essex County Girls' Vocational School, "Training for Nursing Attendants."——Drs. David M. Davis, Philadelphia, and Joseph C. Lovitt, Camden, addressed the Camden County Medical Society, October 5, on "Anterior Poliomyelitis with Special Reference to Early Diagnosis" and "Visual Examination of the Urine as a Guide to Urologic Diagnosis" respectively.——Dr. Arthur M. Master, New York, addressed the Hudson County Medical Society, Jersey City, October 5, on "Prognostic Factors in Coronary Thrombosis."——Drs. Henry H. Kessler, Newark, and Charles Murray Gratz, New York, addressed the Bergen County Medical Society, Hackensack, October 12, on "Cineplastic Surgery" and "Facial Adhesions as a Cause of Pain" respectively.——Dr. Joseph Stokes Jr., Philadelphia, addressed the Burlington County Medical Society, Moorestown, September 9, on "Newer Knowledge Concerning Influenza."——Dr. Norman H. Jolliffe, New York, addressed the Passaic County Medical Society, Paterson, September 9, on "The Clinical Importance of Avitaminosis."

NEW YORK

Society News.—Dr. Stanley P. Reimann, Philadelphia, addressed the Ulster County Medical Society, Kingston, October 21, on "Secondary Lesions of the Breast."——Dr. Julius H. Hess, Chicago, addressed the Onondaga Medical Society, Syracuse, October 28, on "Early Care of Premature Infants and Their Later Physical and Mental Development."——Dr. Werner J. Rose, Buffalo, addressed the Chautauqua County Medical Society, Cassadaga, September 15, on "Conditions Above and Below the Diaphragm that Simulate Heart Disease."——Dr. Clarence J. H. Durshordwe, Buffalo, and Amos G. Stiker, D.D.S., Addison, addressed the Steuben County Medical Society in Hornell, September 9, on "New Uses of Oxygen" and "Surgery for Immediate Dentures" respectively.

First Pneumonia Institute.—The first of five pneumonia institutes sponsored by the state department of health and the Medical Society of the State of New York was held in Syracuse, October 12, with an attendance of fifty for the full program and about forty who attended the lectures but could not be admitted to the clinics and demonstrations for lack of space. The morning session was given over to lectures on the following subjects: "Early Clinical Diagnosis of Pneumonia," "Bacteriologic Diagnosis of Pneumonia," "Oxygen Therapy" and "Serum Therapy of Pneumococcus Pneumonia." The speakers were Drs. Edward C. Reifenstein Sr., Oliver W. H. Mitchell and Orren D. Chapman, Syracuse; David D. Rutstein, Albany, and Jesse G. M. Bullowa, New York. There were clinical demonstrations of these points, followed by a clinic on treatment showing results of serum therapy. The general sessions were held at the Syracuse Memorial Hospital and the demonstrations at both the hospital and the Syracuse University School of Medicine. It is planned that another institute will be held in Syracuse for physicians who could not be accommodated at the first one. Other institutes will be held in Rochester, Buffalo, Albany and New York City.

New York City

Hospital News.—Dr. Russell M. Wilder, Rochester, Minn., gave a lecture October 19 at Mount Sinai Hospital on "Treatment of Addison's Disease with Salts of Sodium and a Restricted Intake of Potassium."——Dr. Leo M. Davidoff has been appointed director of surgery at the Jewish Hospital of Brooklyn.

New Beth David Hospital Dedicated.—A new million dollar building for Beth David Hospital at 161 East Ninetieth Street was dedicated October 17. The new building, which has ten stories and will accommodate about 200 patients, was opened for patients October 27. Mr. Samuel G. Ascher, superintendent for the past four years, has been made executive director. The hospital was formerly at Lexington Avenue and One Hundred and Thirteenth Street.

Diseases Under Investigation at Rockefeller Institute.—The Hospital of the Rockefeller Institute for Medical Research announces that certain diseases are now under investigation and suitable patients may be referred by physicians and others interested. No charges are made for treatment, room, board or other services. Physicians should communicate by telephone or personal application before sending patients. The diseases are as follows:

Diseases of the blood: Aplastic, idiopathic pernicious or severe microcytic anemia; sprue, or severe glossitis and stomatitis without anemia.

Nephritis: Nephritis in initial acute stages and nephrosis; young children especially desired.

Heart disease: Advanced heart failure in all age groups, but especially in older patients.

Rheumatic fever: Any early acute form; also acute sore throat, hemolytic streptococcus infections in rheumatic patients.

Chickenpox and measles: Measles in preeruptive stage, chickenpox; encephalitis following infectious diseases.

Acute lobar pneumonia and bronchopneumonia in adults.

Society News.—Drs. Paul C. Swenson and Ross Golden addressed the New York Roentgen Society, October 18, on "Neoplasms" and "Infections and Deficiency States" respectively.——Speakers at a meeting of the New York Pathological Society October 28 were Drs. Andrea Saccone and Abraham Rosenthal, on "Colostrum Cell Sarcoma of the Breast"; Richard Lewisohn, "Effect of Subcutaneous Injections of Concentrated Spleen Extracts on Mouse Sarcoma 180" and Paul Klemperer, "Chronic Intrahepatic Obliterating Cholangeitis."——The first lecture to the public in the third annual series of the New York Academy of Medicine was delivered October 28 by Dr. Francis R. Packard, Philadelphia, entitled "From Barber-Surgeons to Surgeons."——Dr. George G. Ornstein delivered a Friday afternoon lecture before the Medical Society of the County of Queens, October 15, on "Pathogenesis of Pulmonary Tuberculosis, Its Importance in Diagnosis and Therapy."——The section on laryngology, rhinology and otology of the Medical Society of the County of Kings will present a special program on "Problems of the Hard of Hearing" November 10, with addresses presenting the practical, educational and legislative points of view. There will also be exhibits and demonstrations of instruments and lip reading.

OHIO

Personal.—Dr. Arthur W. Thomas, Ashtabula, has been appointed chief of the bureau of child hygiene and maternal welfare, state department of health, to succeed Dr. Abram L. Van Horn, who resigned several months ago. Dr. Thomas graduated from Ohio State University College of Medicine in 1914.——Dr. Carl J. Wiggers, Cleveland, has returned from a tour of the Orient, where he delivered a series of lectures at Canton, Hong Kong, Shanghai, Peiping, Seoul, Kyoto and Tokyo.——Dr. Claude S. Beck, Cleveland, received the honorary degree of doctor of science from Franklin and Marshall College, Lancaster, Pa., October 3.

Society News.—Clarence Cook Little, Sc.D., Bar Harbor, Maine, addressed the Academy of Medicine of Cincinnati, October 12, on "Recent Advances in Biological Research on Cancer."——Dr. Charles G. Johnston, Detroit, addressed the Academy of Medicine of Toledo and Lucas County, Toledo, October 1, on "Treatment of Intestinal Obstruction by Means of the Abbott Tube."——At a meeting of the Summit County Medical Society, Akron, October 5, Dr. Marion A. Blankenhorn, Cincinnati, made an address on "Modern Treatment of Pneumonia."——At the first fall meeting of the Montgomery County Medical Society, Dayton, October 1, the speakers were the following, all of Cleveland: Drs. Walter J. Zeiter, on "Clinical Applications of the Newer Developments in Physical Therapy"; Everett N. Collins, "Diseases of the Colon," and Thomas E. Jones, "Surgical Treatment of Diseases of the Colon."

OKLAHOMA

Special Meeting of Delegates.—A special meeting of the house of delegates of the Oklahoma State Medical Association was held in Oklahoma City November 3 to consider pending medical legislation.

Society News.—Drs. Evans E. Talley and Alfred J. Metscher, Enid, addressed the Garfield County Medical Society, Enid, September 30, on "Diseases of the Thyroid Gland" and "Management of Cross Eyes" respectively.——Drs. C. J. Fishman and Jess D. Herrmann, Oklahoma City, addressed the Okmulgee County Medical Society, Okmulgee, September 27, on "Complications and Sequelae of Head Injuries."

OREGON

Society News.—Dr. Frederick Lemere, Seattle, addressed the Central Willamette Medical Society, Newport, September 4, on "Insulin Shock Treatment of Psychosis."——Dr. George F. Cooper, San Francisco, addressed the Lane County Medical Society, Eugene, September 17, on "Treatment of Pneumonia."

State Medical Election.—Dr. Charles E. Sears, Portland, was chosen president-elect of the Oregon State Medical Society at the annual meeting in Salem, October 21-23, and Dr. Charles T. Sweeney, Medford, was inducted into the presidency. The following vice presidents were elected: Drs. William W. Baum, Salem; Richard B. Adams, Portland, and Dean P. Crowell, North Bend. Dr. Morris L. Bridgeman, Portland, was reelected secretary.

PENNSYLVANIA

Personal.—Dr. Gilmore Pontius, chief surgeon, Lancaster General Hospital, Lancaster, received the honorary degree of doctor of science from Franklin and Marshall College, Lancaster, October 3.——Dr. William Moore Guilford, Lebanon, will be 105 years old November 26. Dr. Guilford graduated from the University of Pennsylvania School of Medicine in 1852.

Philadelphia

Personal.—Dr. Karl M. Houser, assistant professor of otolaryngology, University of Pennsylvania School of Medicine, received the honorary degree of doctor of science from Franklin and Marshall College, Lancaster.——Dr. Charles A. E. Codman has been elected president of the Philadelphia Institute of Medical Research to succeed the late Dr. Judson Daland. Dr. Codman was one of the group that founded the institute in 1923.

Dr. Daland Leaves Bequest for Foundation.—Dr. Judson Daland, who died August 14, left the bulk of his estate to the American Philosophical Society to endow "The Judson Daland Foundation for Research in Clinical Medicine." Ten per cent of the income is to be added to the principal each year. About $35,000 from the estate is provided for personal bequests. Dr. Charles A. E. Codman received first choice of Dr. Daland's medical books and papers and the Philadelphia County Medical Society the second choice. The society also received a bronze bust of Dante. An inventory filed October 4 listed the estate at $359,507, exclusive of realty.

Society News.—Among speakers at a meeting of the Philadelphia Allergy Society, October 27, were Drs. Herman Gold, Chester, Pa., on "Active Immunization of Allergic Patients Against Tetanus and Follow-Up Study" and John A. Murphy, "Propadrin Hydrochloride in the Treatment of Allergic Manifestations."——Speakers on the program of the Philadelphia Academy of Surgery, November 1, were Drs. Thomas A. Shallow and William T. Lemmon, on "Benign Tumors of the Stomach"; Norman E. Freeman, Philadelphia, and Irvine H. Page, Indianapolis, "Prevention of Shock from Hemorrhage by Total Sympathectomy"; Eldridge L. Eliason and John Paul North, "Morbidity of Cholecystectomy."

Pittsburgh

Society News.—Drs. George J. Feldstein and William H. Clark addressed the Pittsburgh Pediatric Society, October 15, on "Amaurotic Family Idiocy" and "The Use of Irradiated Milk in Infant Feeding" respectively.——Dr. Alice Hamilton, Boston, was the guest speaker before the Allegheny County Medical Society, October 19, on "New Developments in Industrial Poisons." Drs. James Leroy Foster and Joseph M. Cameron presented papers on "Reasons for Failure to Diagnose Syphilis in the New-Born" and "Facial Neuralgias: Causes and Treatment" respectively. A motion picture on "Human Sterility" prepared by Drs. Paul Titus, Benjamin R. Almquest, Ralph E. Tafel and Robert H. McClellan, was shown.

SOUTH CAROLINA

Society News.—At a meeting of the Seventh District Medical Society at Cain's Mill near Sumter September 9 the speakers were Drs. Thomas Preston White, Charlotte, N. C., on "Chronic Arthritis and Its Treatment"; Thomas C. Davison, Atlanta, "Treatment of Goiters"; Joseph H. Cannon, Charleston, "Congestive Heart Disease," and Rupert H. Fike, Atlanta, cancer.——Drs. George R. Wilkinson and John F. Rainey, Greenville, addressed the Greenwood County Medical Society, September 30, on "Abdominal Manifestations of Cardiac Disease" and "Extracardiac Causes of Heart Failures" respectively.

SOUTH DAKOTA

Faculty Changes at Medical School.—The University of South Dakota School of Medicine, Vermillion, announces several changes in the faculty. Einar Leifson, Ph.D., formerly instructor in bacteriology at Johns Hopkins University School of Medicine, Baltimore, has been appointed professor of bacteriology, succeeding Charles A. Hunter, Ph.D. William H. Waller, Ph.D., recently instructor in anatomy at George Washington University Medical School, Washington, D. C., is professor of anatomy, succeeding C. M. MacFall, Ph.D., and John T. Manter, Ph.D., recently at Columbia University, New York, is assistant professor of anatomy. H. Morrow Sweeney, Ph.D., formerly instructor in physiology, Tulane University of Louisiana School of Medicine, New Orleans, is head of the department and professor of physiology, succeeding Harry V. Atkinson, Ph.D., who is now professor of pharmacology and materia medica.

TEXAS

Changes in the University Faculty.—Among recent changes in the faculty of the University of Texas School of Medicine, Galveston, the *Texas State Journal of Medicine* reported the following resignations: Drs. Frances J. L. Blasingame, assistant professor of anatomy; John F. Pilcher, associate professor of pathology, and J. John Westra Jr., Ph.D., assistant professor of physiology. Dr. Samuel R. Snodgrass, Franklin, Ind., has recently been appointed assistant professor of neurosurgery.

Personal.—Dr. Louis R. Brown, Little Rock, Ark., has been appointed superintendent of the Galveston State Psychopathic Hospital, succeeding Dr. Giles W. Day. A new addition to the Galveston hospital providing for forty-five patients was recently opened.——Dr. Brooks Stafford, Angleton, has been appointed health officer of Brazoria County to succeed the late Dr. Samuel B. Maxey.——Dr. Samuel J. Pate, Woodville, was honored with a testimonial dinner September 2 given by physicians of Woodville and Beaumont, where he practiced for many years. Dr. John A. Hart, Beaumont, was toastmaster.

Society News.—Drs. Alfred L. Hathcock, Palestine, and Harry M. Spence, Dallas, addressed the Henderson County Medical Society, Athens, September 6, on "Sarcoma of the Uterus" and "Frequency of Urination in Women" respectively.——Drs. Thomas M. Oliver and Horace T. Aynesworth, Waco, were the speakers at a meeting of the McLennan County Medical Society, Waco, September 14, on "Advances in the Treatment of Varicose Veins" and "ABC's of Electrocardiography" respectively.——At a meeting of the Tarrant County Medical Society, Fort Worth, September 7, the speakers were Drs. Clarence C. Garrett on "Heat Exhaustion"; James H. Hook, "Poliomyelitis" and John W. Tottenham Jr., "Immunizing Blood Transfusions."——The Dallas Southern Clinical Society will hold its tenth annual clinical conference, March 14-17, 1938, at the Adolphus Hotel.——Dr. Samuel A. Shelburne, among others, addressed the Dallas County Medical Society, October 13, on "The Rational Use of Acacia in the Management of the Nephrotic Syndrome."

VIRGINIA

Personal.—Dr. Charles L. Savage, Richlands, has resigned as health officer of Tazewell, Buchanan and Russell counties.——Dr. Edward N. Schillinger, chief medical officer of the Veterans Administration Facility, Kecoughton, has been transferred to Atlanta as chief medical officer of the Veterans Administration Facility there, it is reported.

WEST VIRGINIA

Society News.—Dr. Hugh H. Trout, Roanoke, Va., addressed the Kanawha Medical Society, September 14, in Charleston, on "Varicose Ulcers."——Dr. James Torrance Rugh, Philadelphia, addressed the Ohio County Medical Society, Wheeling, October 8, on "Some Problems of the Lower Part

of the Back."——The Hospital Association of West Virginia held its annual meeting in Wheeling, October 7-8.——Dr. Curtis F. Burnam, Baltimore, addressed the Harrison County Medical Society, Clarksburg, September 2, on cancer of the uterus.

WISCONSIN

Memorial Lecture by Dr. Gross.—Dr. Louis Gross, New York, delivered the Lippitt Memorial Lecture at Marquette University School of Medicine, Milwaukee, October 15, on "Considerations Concerning Coronary Occlusion." Dr. Gross was one of the seventeen persons killed in the crash of the airplane *Mainliner* in Utah October 17.

University News.—Dr. Everett D. Plass, Iowa City, addressed the University of Wisconsin Medical Society, Madison, in a joint meeting with the medical school preceptors October 15 on "Polyneuritis of Pregnancy." Dr. William Snow Miller, emeritus professor of anatomy, made an address October 21 on "Some Vital Points in the Architecture of the Lung."

PHILIPPINE ISLANDS

Society News.—At a meeting of the Manila Medical Society recently the speakers were Drs. Honoria Acosta-Sison and Juan S. Galang, on "Chorionepithelioma with Report of Six Recovered Cases" and Dr. Pablo Anzures, "Is Therapeutic Abortion Legal?"

GENERAL

Americans at International Congress.—Thirty-seven American physicians attended the International Congress on Hepatic Insufficiency in Vichy, France, September 16-18. The following presented papers: Drs. Anthony Bassler, New York; Lathan A. Crandall Jr. and Andrew C. Ivy, Chicago; Norman W. Elton, Reading, Pa., and Hyman I. Goldstein, Camden, N. J., all speaking on "Hepatic Insufficiency in Its Relation to General Nutrition and Especially to the Nervous System."

Society News.—Dr. Robert Tait McKenzie, Philadelphia, was elected president of the Academy of Physical Medicine at the annual meeting in Philadelphia, October 19-21; Drs. Rolland A. Case, Cleveland, and William H. Schmidt, Philadelphia, were elected vice presidents, and Dr. Herman A. Osgood, Boston, was reelected secretary.——The Pacific Coast Society of Obstetrics and Gynecology held its annual meeting in San Francisco, November 3-6.——The Society for the Study of Asthma and Allied Conditions will hold its fall meeting at the Waldorf-Astoria Hotel, New York, December 11. Dr. William C. Spain, 116 East Fifty-Third Street, New York, is secretary.

Research Fellowships Available.—The National Research Council announces that fellowships in the medical sciences will be available for the year beginning July 1, 1938. These fellowships are open to citizens of the United States and Canada who have the degree of doctor of medicine or doctor of philosophy. The announcement notes that the fellowships are intended for recent graduates and not for persons already professionally established. Applications must be filed on or before Jan. 1, 1938, and fellows will be appointed at a meeting of the medical fellowship board about March 1. For further information address the secretary of the Medical Fellowship Board, National Research Council, 2101 Constitution Avenue, Washington, D. C.

New Officers of Radiological Societies.—Dr. Raymond G. Taylor, Los Angeles, was chosen president-elect of the Radiological Society of North America at its recent annual meeting in Chicago, and Dr. Howard P. Doub, Detroit, was installed as president. Dr. Donald S. Childs, Syracuse, N. Y., is the secretary. Dr. John W. Pierson, Baltimore, was named president-elect of the American Roentgen Ray Society and Dr. Byrl R. Kirklin, Rochester, Minn., was installed as president. Dr. Carleton B. Peirce, Ann Arbor, Mich., was chosen secretary. The next annual session will be held at Atlantic City, probably Sept. 20-23, 1938. New officers of the American College of Radiology include Drs. James M. Martin, Dallas, Texas, president, and Eugene P. Pendergrass, Philadelphia, secretary.

Fellowships in Psychiatry.—The National Committee for Mental Hygiene has available a limited number of fellowships for training in extramural psychiatry, provided by the Commonwealth Fund and other sources. Fellows will be assigned for one or two years to a selected child guidance clinic, the term and plan of the fellowship to be determined by the peculiar needs of the fellows. Candidates for fellowship awards should have had at least two years of psychiatry in an approved mental hospital service, in addition to other qualities fitting them for extramural service. This provision of training fellowships comes in response to a definite paucity of personnel in this field, the announcement stated. Requests for further information about these fellowships, and applications therefor, should be addressed to Dr. George S. Stevenson, The National Committee for Mental Hygiene, room 822, 50 West Fiftieth Street, New York, N. Y.

Impostor Impersonates Pathologists.—Several pathologists have recently reported that a man posing as a pathologist has been using the name of Dr. Eustace L. Benjamin, associate professor of pathology at Northwestern University Medical School, Chicago, to obtain money through fraudulent checks. Dr. Emmerich von Haam, Columbus, Ohio, who first reported cashing a check for the man in the belief that he was Dr. Benjamin, says that the impostor has since called himself Dr. von Haam and Dr. Simonds of Chicago. Whatever name he uses, he refers to other pathologists as his close friends. He is familiar with medical terminology and has a fair knowledge of laboratory methods. This man is about 40 years old, of average size, with dark eyes and hair tinged with gray. His neck is short and thick, his face is round and his small eyes bulge somewhat. Dr. Benjamin reported that he cashed a check during the past winter for this man, who at that time said he was a pathologist from Mercy Hospital, Canton, Ohio. Checks for amounts ranging from $10 to $100 have been cashed for him by pathologists in several laboratories.

CANADA

Graduate Course at Dalhousie.—A refresher course in medicine and surgery was presented at Dalhousie University Faculty of Medicine, Halifax, N. S., for a week beginning August 30. The instructors were Drs. Howard M. Clute, Boston, on "Management of Abdominal Emergencies"; Leo Kanner, Baltimore, "Modern Trends in Psychiatry" and Richard A. Kern, Philadelphia, "Clinical Allergy" and "Duodenal Ulcer."

Society News.—Dr. Alfred Howard Spohn, Vancouver, addressed a meeting of the Vancouver Medical Association, October 5, on "Conditioned Reflexes and Their Relation to Medical Practice."——Dr. Charles H. Hair delivered his inaugural address as president of the Academy of Medicine of Toronto, October 5, on "How Medicine Is Influenced by Economic Conditions."——The North Pacific Society of Internal Medicine held its fall meeting in Victoria, B. C., with Dr. Edwin G. Bannick, Rochester, Minn., as guest speaker, on nephritis, blood sedimentation tests and sulfanilamide therapy.

The Poliomyelitis Epidemic in Ontario.—A summary of the recent outbreak of poliomyelitis in Ontario, published in the October issue of the *Canadian Public Health Journal*, states that 2,180 cases were reported in the province from January 1 to October 2. The largest number in any one week was 413 for the week ended September 4. There were 697 cases in Toronto. The provincial health department has records of 450 cases in which there is some degree of paralysis or weakness. For treatment of these patients a special orthopedic hospital has been opened in Toronto with accommodations for 100 children. Three weeks' free treatment is given. Twenty-three respirators have been made available with funds provided by the provincial health department.

Deaths in Other Countries

Sir John W. Thomson-Walker, consulting urologist and emeritus lecturer on urology, King's College Hospital, London; Hunterian professor, Royal College of Surgeons of England, 1907; author of various publications on urology; president of the fifth International Congress of Urology; died October 6 in Aviemore, Inverness-shire, Scotland, aged 60.——**Sir John W. Moore,** formerly professor of the practice of medicine, Royal College of Surgeons in Ireland; author of textbooks and for many years editor of the *Dublin Journal of Medical Science;* former president of the Royal Academy of Medicine in Ireland and of the Royal College of Physicians of Ireland; died October 12, aged 91.

CORRECTION

Assistant Professor of Orthopedics.—Dr. Jesse T. Nicholson has been promoted to assistant professor of orthopedics in the Graduate School of Medicine, University of Pennsylvania, and not assistant professor of obstetrics, as noted in THE JOURNAL, October 23, page 1372.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Oct. 9, 1937.

The British Medical Association and the Public

The British Medical Association has made a new departure. A special meeting of the council was convened to consider a memorandum of proposals for organizing public opinion on behalf of the association and improving the public relations of the medical profession generally. It seems to the council that although individual members of the public have, as a general rule, high regard for their own physicians, the public as a body is often suspicious and critical of the medical profession as a whole and of the British Medical Association in particular. Physicians are news when they are in trouble, as when charged with drunkenness, when they appear in the divorce court or when charged with negligence. The public is in great measure ignorant of the work of the association's on medico-sociological problems. It is reminded of the national health insurance service only when a defaulting physician is fined; it knows nothing of the association's plan for the extension and amplification of this service or for an improved maternity service. The council is advised that the association can apply propaganda and advertisement without compromising the dignity or status of the profession. The objectives would be to instruct and improve public opinion regarding physicians, to enlighten the public regarding the work of the medical profession, to advise the press to be more constructive and less destructive, more informative and less irresponsible in handling its news regarding physicians and the association. The council decided to establish a propaganda fund to be financed from the association funds and by the trustees of the national insurance defense fund for a period of three years. There will be a propaganda committee and a public relations officer.

Sciatica Due to Prolapse of an Intervertebral Disk

Sciatica due to prolapse of an intervertebral disk is a condition that has only recently been recognized. At a meeting of the Section of Orthopaedics of the Royal Society of Medicine, Mr. Norman L. Capener reported a case which he had cured by laminectomy. He referred to a paper which he had read at a meeting of the British Orthopaedic Society in 1934, when he discussed the influence of certain spinal movements on the cause of sciatica. As the result of radiologic studies of normal spines he stated that sciatica due to compression stresses on nerve roots was more apt to occur in hyperextension but that traction stresses were most likely to be the cause of trouble when the lumbosacral spine was hyperflexed. He then demonstrated the opening up posteriorly of the intervertebral interval in hyperextension and remarked on the ease with which prolapse of the nucleus pulposus could occur in this position. He now said that most cases of traumatic sciatica occur with a force exerted in the flexed position, which is often associated with the lifting of heavy weights. It was easy to understand the possibility of a portion of the disk being extruded like a pea out of a pod.

A railway engine driver, aged 41, sprained his back at work in August 1935 and soon began to suffer severe pain in the right buttock and thigh, which was increased after exertion but relieved by lying down. When seen in September he had typical right-sided sciatica with homolateral scoliosis, rigid lumbar spine, gluteal wasting and diminished Achilles reflex. There were no sensory changes. X-ray examination was negative. For six months he received the usual conservative treatment—radiant heat, massage, plaster jacket, sciatic nerve stretching, epidural injections and manipulations under an anesthetic—all without lasting improvement. In the summer of 1936 the sciatica became much worse and involved the opposite side.

Oct. 30, 1936, lumbar puncture was performed at the level of the third and fourth lumbar vertebrae. The pressure was found normal and the usual rise occurred on jugular compression. Procaine hydrochloride solution was injected into the epidural space and produced a small rise in intrathecal pressure, which did not correspond to the amount injected, suggesting partial spinal block. Two days later 5 cc. of iodized oil was injected into the theca at the first lumbar interspace and radiography strongly suggested a constriction of the theca arising from the front of the canal in the region of the disk between the fourth and fifth lumbar vertebrae. The injection produced severe pain, which had to be relieved by a further lumbar puncture.

November 12, laminectomy was performed on the fourth and fifth lumbar and first sacral vertebrae. The constriction mentioned was confirmed: there was no pulsation below this level, and the posterior projection of the disk was verified. Moreover, the constriction of the dura appeared to be circumferential. This was widely opened up in the middle line; the disk was not interfered with and the wound was closed. After recovery from the operation the patient had immediate and complete relief, and all signs of sciatica disappeared. He resumed his usual work, which involved coaling the furnace.

PARIS

(From Our Regular Correspondent)

Oct. 9, 1937.

Second International Gastro-Enterologic Congress

The second Gastro-Enterologic Congress was held September 13 at the Faculté de médecine. More than 600 specialists from thirty-five foreign countries attended the meeting. Prof. M. Loeper was president of this year's congress and introduced Prof. Pierre Duval, who called attention to the necessity of team work between surgeons who specialize in gastro-intestinal surgery and gastro-enterologists who make the diagnosis and carry on the after-treatment. The first question to be discussed was early recognition of gastric cancer, of which the clinical and serologic aspects were the subject of a paper by Carnot and Caroli. They said that the diagnosis was usually made too late so that removal is impossible in three fourths of the cases when exploratory laparotomy is performed. This is often due to the latent character of the initial symptoms. In one third of the cases, the onset dates back about five months from the time at which the patient is first seen. The only way in which the high percentage of inoperability can be reduced would be the routine use of x-ray examination in all suspicious cases. A fourth of the patients neglect to have this done in spite of a history of digestive disturbances of long duration. There is nothing pathognomonic about the early symptoms. Anorexia is observed in only 14 per cent of patients and the pain is usually relieved by medication. The question of age has been found to be of no importance. Familial antecedents may be of some help in the clinical history. The difficulty of making an x-ray diagnosis was emphasized and the problem which presents itself is as to whether an ulcer exists which has undergone malignant changes or whether the symptoms are terminal and indicative of a phase of inoperability. Ulcerating cancers are more common than any other type.

This paper was followed by one on x-ray diagnosis by René Gutmann, who believed that an early diagnosis can be made if serial films are made as a routine and are correctly interpreted. At its very onset, cancer of the stomach cannot be recognized radioscopically, so that this method alone does not suffice. On the other hand, films that show rigidity of the stomach contour indicate an infiltrating type of cancer, whereas a niche is found in the ulcerative, tumor-forming and vegetant types.

In one out of five cases, Gutmann and Bertrand were able to trace the change from a benign to a malignant form of ulcer. The ulceriform cancer has the appearance of a niche with sharply demarcated borders. In these, one finds the Carman meniscus sign. The evolution of such niches must be followed at repeated examinations. The therapeutic test consists in intravenous protein treatment. If the x-ray signs persist, immediate operative intervention should be advised. The pathologic anatomy, physiopathology and biochemistry and the value of gastroscopy and of gastrophotography in cancer of the stomach were the subjects of papers by Cagnetto of Italy, Bottin of Belgium, Felsen of the United States, Moutier of Paris and Garin and Bernau.

Bertrand of Paris reported on the aspects of ulcers developing into cancers based on microscopic studies when taken in conjunction with x-ray observations.

Charrier and Gatellier pointed out that it is impossible for a surgeon on examination of the stomach, at operation, to differentiate between a benign and a malignant ulcer.

Gosset and Duval in their general conclusions based on all the preceding papers stated that (*a*) clinical signs and the evidence yielded by gastric chemistry were inadequate for diagnostic purposes; (*b*) direct (at operation) and gastroscopic examinations are deceptive; (*c*) only the microscopic and x-ray examinations and therapeutic tests are of any value. If there is an association of amelioration of symptoms and of x-ray evidence, this speaks for the benignity of the lesion. If there is amelioration of the symptoms but persistence of x-ray signs, this speaks for probable malignancy; hence the key to the situation consists in repeated x-ray and clinical examinations.

Katsch, Prevot, Henning, Buerger, Staemmler and Konjetny, all German delegates to the congress, emphasized the important part played in the etiology of gastric cancer by a preceding or concomitant gastritis when associated with adenomas or polyps, which were frequently found in their cases.

Examination of Applicants in Transportation Services

One of the most interesting exhibits in this year's Paris Exposition is that of the psychotechnical department of the French transportation, urban and railroad, services. The tests given to applicants for positions as bus or street car motormen and locomotive, oil and steam propelled, engineers reveal the progress made in the last twenty years in the application of information obtained through studies in psychologic laboratories to commercial work.

A monograph has just appeared on the Paris experience by J. M. Lahy, published by Dunod. In the preface, the director of the technical division of the Paris transportation services (motor busses and subways), Mr. Bacquerisse, states that the medical examination of applicants aids in eliminating those whose cardiovascular and other conditions which will not permit heavy physical exertion and other physical defects, but only psychologic tests, will be able to exclude from work as signal tower operators those individuals who are unable to concentrate or who fatigue mentally too rapidly. The Paris transportation services employ more than 30,000 men and women (many of the latter as omnibus conductors). Scientific selection of applicants has effected an economy of more than a million francs a year. Psychotechnology is a comparatively recent science which studies how to reduce the expenditure of nervous energy, necessarily associated with every physical effort. It also aims to increase mental activity without too much of a drain on the nervous system. The limit or threshold, so to speak, at which signs of mental fatigue appear is not a uniform one but is subject to individual variations. To attain the maximum return with a minimum of effort, the primary condition to realize is that every worker should be mentally equipped to carry out his particular task. If he is capable of doing this in several tasks, selection must be made of the one for which the applicant has the greatest aptitude.

Variations in muscular activity have a narrower range, one to five or six, than those of mental activity, which vary from one to several millions. It is a mistake to think that the constant repetition of some small movement, if not followed by fatigue, is an adequate criterion of mental fitness, because in actual practice the length of time and rhythm necessary to execute it is always determined in advance. Certain individuals show signs of mental fatigue when called on to execute easy but monotonous tasks more than others. The man who is in charge of a railroad signal tower must be able to react quickly and be possessed of a good memory. Methods employed to determine professional aptitude should be objective; i. e., studied graphically.

In France, these methods have been studied during the past twenty years in the laboratory for experimental psychology of the Ecole pratique des hautes études and more recently in the psychotechnical laboratories of the French transportation services. The results of the examinations of more than 10,000 applicants for positions as motormen, signal service operators, and so on, are recorded in the recently published monograph of the director of the latter laboratory, Dr. Lahy.

Social Insurance as Applied to Railroad Employees

When social insurance was first introduced here in 1930, no provision was made for workers employed on railroads. This omission was corrected in 1931, but the rules contain some material differences from those applicable to nonrailroad employees, as follows: (*a*) Sickness indemnity can be paid only to the individual employee and not for any illness of the wife or husband, as the case may be, or for any illness of the children of the employee. (*b*) In case of absence for confinements, the worker is entitled to twelve weeks' full pay. (*c*) In case of illness or confinement, the worker can be cared for only by the company's physician and does not have the right, as in the case of workers not employed on railroads, to select his own medical attendant.

BERLIN

(From Our Regular Correspondent)

Sept. 13, 1937.

International Congress on Graduate Medical Study

The International Congress on Graduate Medical Study was held in Berlin August 21-25. Its objectives were an exchange of information on the conduct of graduate courses in various countries and the world wide promotion of graduate study. In many lands postgraduate medical education has become highly organized. For the last two years members of the German medical profession have been subject to a legislative innovation in this regard, all doctors (with the exception of university docents, directors of the larger hospitals and military and civilian physicians in government service) being required to participate every five years in a graduate course of three weeks' duration (THE JOURNAL, Nov. 9, 1935, p. 1535). Altogether, 300 hospitals in sixty-eight different German cities have been designated as institutions suitable for graduate studies. This wide distribution enables the individual physician to remain near his home while studying and thus the personal expenses entailed are kept within reasonable bounds. Moreover, no tuition fees are exacted for the courses themselves. The question of locum tenentes has shown itself to be the most difficult feature of this system, since the employment of a substitute is rather costly to the practitioner. Latterly, however, a system of reciprocal substitution among physicians of each community has been worked out and in addition the placement exchange of the German Medical Association stands prepared to assist in any emergency. For the accommodation of doctors in attendance on a course the establishment of a chain of conveniently located "physicians' homes" has been planned; several of these hostels are already in existence. Of about 40,000 physicians of

Germany, some 25,000 will participate quinquennially in this rotated compulsory study program. The planners of German graduate curriculums have considered it desirable that each student physician should acquire a knowledge of the basic principles involved in the procedures of "nature medicine" so far as the latter have been proved valuable. Acquaintance with the fundamentals of homeopathy is also considered of importance.

At present there are in Germany three academies of graduate medical study and the foundation of a fourth is contemplated. The Berlin academy is to retain its present general character. The Dresden academy will in future concern itself principally with the problem of the integration of "Nature Medicine" within the framework of medical science as a whole. The curriculums of the Hamburg academy will be expanded to include special courses in tropical hygiene, tropical diseases and overseas medicine in general. The fourth academy, to be situated in Munich, will be set aside for a wholly new type of instruction: there, in the interest of national health policy, an attempt will be made to bring the therapeutic and prophylactic services of the physician into the closest possible contact with the active worker on the job. Specifically, a doctor enrolled at the Munich academy will be made conversant with industrial physiology and with the so-called early lesions of occupational disease and will study the feasibility of prophylactic measures.

Accordingly, one may truly say that in Germany postgraduate medical study, already highly organized, continues to develop.

The transactions of this well attended international congress were characterized by a lively symposium on methods in which the representatives of thirty-six nations participated. Of even greater importance were the papers submitted by eminent university professors on fundamental pedagogic problems of the various specialties. Other delegates provided interesting descriptions of how the organization of graduate medical study was influenced by conditions peculiar to their respective countries. Dr. Wagner, the national führer of physicians, bid the delegates welcome in an address entitled "The Place of the Physician in the New Germany." He dwelt mostly on topics such as the Nuremberg laws against Jewish physicians, the problems of hereditary disease, the new German education and the organization of the National Chamber of Physicians.

Professor Borst of Munich, pathologic anatomist, then discussed "Research and Graduate Study." Speaking from the standpoint of general pathology he spoke of the demands of medical practice and the interrelation of the various specialties. The universities have undergone marked expansion in order to meet the educational standards of the present day. A great scientist, said Borst, should know how to combine strict interpretation of results and his own confident expectation; he should also be able to bring his scientific opinions into harmony with his weltanschauung. Graduate study ought not only to facilitate progress in the specialties, it should also help to explain their interdependence and the importance of each to medical science as a whole. Thus will be avoided that too great preponderance of theory which often tends to obscure the practical application of specialties. Only a doctor who has engaged in research can feel sure of himself in the presence of manifold and varying clinical pictures. The need of a broader outlook differs with the individual physician. According to investigators of the German situation, most physicians could profit by graduate study, and especially by research study.

Dr. Blome described the organization of graduate study in Germany and several of the foreign delegates did likewise for their respective countries: the United States, represented by Dr. Foster Kennedy; France, Austria, Japan, Italy, Switzerland, Latvia and Finland. Special themes were then discussed. Sauerbruch spoke on the graduate education of the surgeon. There was also considerable discussion of the anticancer campaign. Dr. Schraenen, secretary general of the Belgian Anticancer Association, introduced this topic. He was followed by Professor Auler of Berlin, who read the principal paper wherein he discussed the systematic organization of an effective fight against cancer. Various foreign delegates also talked on the cancer problem. Other major topics were occupational and industrial medicine, the graduate study of obstetrics and so on.

One result of this international congress was a resolution passed at a meeting of the delegates from twenty-five countries. It provided for the establishment of an International Academy for Graduate Medical Affairs. A constitution and by-laws for the new organization will be worked out by a committee consisting of Borst of Munich, chairman; Adam of Berlin, secretary general; Bastianelli of Rome, Blome of Berlin, Proctor of London and Roussy of Paris. This international academy will have its permanent seat in Berlin.

The Reaction of Aluminum to Fruit Products

On account of the shortage of raw materials in Germany, the attempt has been made to introduce domestic substitutes for foreign metals; e. g., aluminum for tin. Dr. Reif undertook at the National Health Bureau an investigation to determine to what extent aluminum can supplant other metals used in the handling of food. Experiments were conducted with foodstuffs of an acid character such as apple sauce and plum jam. Two brands of aluminum, one 99.5 per cent and the other 99.8 per cent pure were tested. Numerous experiments showed that the corrosive effect of these acid-containing foods on aluminum was particularly dependent on the water and extract content. In general, the metal of 99.8 per cent purity proved its superiority to that of 99.5 per cent. Alloys of aluminum showed themselves the least resistant to the corrosive action of fruit products. Reif does not attempt any medical evaluation of the data. His report is interesting in the light of earlier studies also sponsored by the National Health Bureau and on the basis of which it was concluded that no danger is entailed in the use of aluminum vessels (THE JOURNAL, Dec. 13, 1930, p. 1849).

AUSTRALIA

(From Our Regular Correspondent)

Sept. 9, 1937.

Australasian Medical Congress

Under the presidency of Sir Henry Newland, 450 delegates from Australia, New Zealand and Great Britain attended the 1937 Australasian Medical Congress, held at Adelaide from August 23 to 25. This congress marked the jubilee of such meetings in Australia. The chief features of the congress were the laying of the foundation stone for the Institute of Medical Science in Adelaide and a major discussion on tuberculosis in Australia. At the official opening, the gold medal of the British Medical Association was presented to Sir Henry Newland, who was the fourth recipient since its institution in 1922. Sir Henry had been secretary of the South Australian branch of the British Medical Association from 1909 until 1914 and became president in 1920. He had performed great service for the federal branch and is at present a vice president of the British Medical Association in Great Britain. He was a founder and the first president of the Royal Australasian College of Surgeons. For many years he was lecturer in surgery and operative surgery at the University of Adelaide. In the war he served with distinction.

The main themes in Sir Henry Newland's presidential address were the application of scientific knowledge to human betterment, the influence of heredity on constitutional disease, the aging of the population, the progress of specialism, and the possibilies of national insurance in Australia. Medicine so far has concerned itself with the conquest of diseases which have their origin in the environment of man. These are the diseases of infancy and adolescence. It can claim to have saved the

babies. But if babies are surviving the environmental diseases, they must die in adult life, or senescence. The diseases of the latter half of life are constitutional diseases; that is, breakdowns of the various organ systems which in their combination form the individual. Reference was made to the extraordinary growth of specialism. The specialist himself often tended to fail to see any point of view but his own. To succeed in the pursuit of a specialty, he must concentrate on its literature and technic. His concentration would almost inevitably make him narrow in his outlook and a source of danger in general medicine. It was therefore of the greatest importance that before a man was fit to limit his practice to a specialty he should be thoroughly trained in general medicine and surgery. The surgical specialist of today is cast in a different mould from the surgeon of 100 years ago. A surgeon of today must have a knowledge of the biologic, physiologic and psychologic disturbances inseparable from all disease processes. Figures were given to show the result of modern care in the reduction of mortality from operations on the kidneys. In operations for kidney stones, mortality had decreased from 19 per cent in 1902 to 9 per cent in 1914 and to about 1 per cent in 1924. A recent review showed an average mortality after operation of 4 per cent, and several large series of cases had been reported without a death. Figures could be quoted to show similar results in other fields. But the changing rate of mortality is not the only change that is taking place in surgery. The operation lists of today differ greatly from those of thirty years ago. It is of general comfort to know that surgery has become more preservative and less extirpatory. Indeed, it is paradoxical that the chief aim of the scientific surgeon should be to find ways of avoiding surgery. The tendency to say "this organ or that structure is diseased, let us cut it out," is giving place to an attempt to save it.

Recognition of the fact that even in a special branch of medicine it was not possible for one man to be the repository of all the knowledge of detail needed for diagnosis and treatment had led to another change. That was the development of the unit, or team, system. That aimed, without interfering with the practice of bringing the medical student into intimate contact with the patients, at grafting on the well tried English system a means whereby clinical education might be placed on a more scientific basis than had been possible before. Not many years ago the governing bodies of the great hospitals considered that it was the duty of the surgeons to do all operations. Now it was being realized that the routine operative work could be done as well by the younger men, leaving more time for the seniors to do progressive work.

One of the great needs of the present is hospitals in which patients with chronic diseases can be adequately treated and where the disease can be made the subject of intensive research. Sir Henry said that one of the great advances of the last fifty years was that the profession had learned to recognize the importance of the prevention of disease as an essential part of a national health service. It was recognized now that doctors had a part to play in the attainment of that state of positive good and efficient physical and mental health which was something infinitely better than the mere absence of disease. Physical education and mental hygiene should take their place among the great social services as a branch of public health, like housing, sanitation and nutrition, through which it was hoped to achieve a high standard of physical excellence, combined with mental and moral discipline. It was of interest to note that the University of Adelaide and the South Australian branch of the British Medical Association had under consideration a suggestion by Sir Stanton Hicks to found a health clinic.

Speaking of the probability of the introduction of compulsory national health insurance, Sir Henry said that, for better or worse, national health insurance was now an accepted part of English life. However effective positive means of insuring health and preventing disease might be, there would always be some who would require examination and treatment. How effective the contemplated measures would be would depend on whether the insurance scheme had the whole-hearted support of the medical profession. Whether that support would be forthcoming would depend on the bill to be presented to the commonwealth parliament.

With regard to the value of graduate work, Sir Henry said that the necessity for it had been fully recognized by the profession but not, unfortunately, by the universities with one exception—Sydney. Was it too much to hope that Melbourne and Adelaide would follow the same enlightened policy? The Royal Australasian College of Surgeons had been active in the cause of postgraduate study and surgical research.

TUBERCULOSIS IN AUSTRALIA

A complete review of the problem of tuberculosis as it exists in Australia was the motif of the congress, and it occupied a plenary session. This disease claimed in South Australia more than three times as many victims as the total for all other infectious diseases. In opening the discussion, Dr. M. J. Holmes, senior medical officer of the Commonwealth Department of Health, showed by a series of graphs that there was a pronounced death rate from tuberculosis in young women in South Australia, rising to 96 per hundred thousand in age group 25 to 29 years compared with 60 for Australia and 50 in New South Wales. The mortality rate in age group 20 to 24 years in South Australia (85 per hundred thousand) was about 40 per cent greater than in New South Wales (51). It was thought that the high mortality in young females compared with males might be due to the special stress placed on the body in child bearing and to the strain of present day life. The mortality from human tuberculosis of bovine origin was now very low in Australia and had declined much more rapidly than the mortality from tuberculosis of human origin. That might be attributed mainly to smaller dosage of infection through the milk supply. Deaths from tuberculosis in Australia were almost exclusively due to the human strain of infection. Consequently our main object must be the breaking of the human chain of infection. Regarding measures for the control of tuberculosis, it was considered essential that all the activities within each state should be under the control of a state director of tuberculosis engaged full time on direction and coordination and given all necessary powers and facilities. The clinic system was the foundation on which all effort for the control and eradication of tuberculosis must be based. Clinics should reach out into the community to maintain the persistent hunt for the earliest manifestations of the disease. There should also be a mobile clinic. Early diagnosis was an essential objective of the clinic system. The examinations, physical and x-ray, should be periodic and should be most frequent and careful between the ages of 15 and 25 years. The high mortality in women from 20 to 30 emphasized the need to look for early evidence in childhood and early adult life.

One of the greatest difficulties in the fight against tuberculosis was the economic one of maintaining the family of the tuberculous sufferer in a reasonably good state of nutrition and in a suitable environment. The invalid pension paid was utterly inadequate to provide suitable nutrition and environment. The position of the tuberculous ex-soldier was much better, as the repatriation department provided not only excellent treatment but a good pension. It was considered of the greatest urgency that some system of monetary allowance should be established which would provide adequately for the families of tuberculous civilian patients and that the allowance would be paid in full when the patient was under treatment at an institution as well as when he was under treatment in his own home. There was a need for accommodation for the patient who has not developed an active focus of disease—the child

with a positive tuberculin skin reaction, who was ill nourished or unhealthy, or who for any reason should be removed for a time from any source of possible infection, and whose resistance required building up. Preventoriums formed the essential links in the system for preventing the development of fresh foci of infection in the community, and they should be provided by the state. Last year 2,836 persons died from tuberculosis in Australia. The cost to the commonwealth and state governments in pensions and in treatment was more than a million pounds a year. If tuberculosis mortality had continued at the same rate as in 1880, the governmental expenditure would now exceed five million pounds a year, instead of one million. The success already attained in fighting tuberculosis was therefore saving Australia millions of pounds every year. The eradication of the disease, which is a practical ideal in this country, would save millions of pounds in the future. Measures directed to the total eradication of the disease would cost less over the next twenty years than is spent at present in partially checking the disease. The success already attained by our incomplete and ill balanced methods is an earnest of the infinitely greater success which would follow the persistent application of wholehearted measures. We should aim at nothing less than a commonwealth free from tuberculosis.

Sir Robert Philp teaches his students that the best climate for tuberculosis is that which woos the patient most into the open air. In this respect Australia is fortunate. With our great natural advantages in climate and in a relatively high standard of living, we can look with nothing but dissatisfaction on the existing mortality rate from tuberculosis in Australia. Dr. Cotter Harvey, who was the next speaker, was in accord with Dr. Holmes. For a campaign to be successful, there were four essentials: an adequate public health organization, a recognition of the part played by the general practitioner, a careful education of the layman, and a thorough education of the medical student in chest diseases. There was need for reform in what was complacently called "sanatorium treatment" in this country, as it had in many cases fallen far below modern standards, although there were some shining exceptions. Contact examination should include all persons with whom the patient had been in close contact. Nor should older people escape examination. Grandfather's so-called bronchitis might have infected many grandchildren. The x-ray survey of selected groups would prove to be the most profitable advance in preventive medicine, provided the utmost care was taken in the interpretation of the films. Finally, the standard of living among the lower classes should be improved and an endeavor made to ensure an adequate diet for all. Tuberculosis was the one disease to which a well fed body was more resistant. Dr. Harvey pleaded for a sympathetic consideration by public health authorities and the Australian governments of tuberculosis control. Federal and state governments have had placed before them carefully considered programs by competent authorities, but we still await the day when some practical moves will be made. In this respect Australia is lagging behind most countries, even admitting that our mortality is among the lowest in the world. A continuance of the present policy of apathy and delay in financing a comprehensive campaign against tuberculosis, a preventable disease which in Australia is responsible annually for the deaths of nearly 3,000 persons, more than half of whom are under the age of 45, is not merely a moral crime: it is an economic blunder.

Tuberculosis in man could not be adequately dealt with unless consideration was given to the knowledge gained by study of the disease in the lower animals said Dr. L. B. Bull, director of the Divisions of Animal Health and Animal Nutrition in the Council for Scientific and Industrial Research. All the domesticated animals were susceptible to the disease, and it varied in frequency in different species. Man could become infected by the use of animal products as food, or he might himself infect one or more species, which, in turn, might spread the disease among their own species as well as among human society. Tuberculosis was most common in cattle, fairly common in pigs, not uncommon in dogs, but rare in sheep and goats. It was common in birds, particularly in the northern hemisphere, and also affected wild animals in captivity. Outlining the control of tuberculosis in animals, Dr. Bull said that systematic tuberculin testing and destruction of infected animals was an ideal method for the eradication of tuberculosis. Dr. Harvey Sutton considered that insufficient data were available about tuberculosis, particularly with regard to the number of early cases treated. There should be more information, particularly about infection among medical men themselves.

Cases in which surgical intervention could be employed in the treatment of tuberculosis were discussed by Grey Turner, professor of surgery at the University of London, in his presidental address to the surgical section of the congress. One question that needed more attention, he said, was that of the survival of the activity of disease germs. Cases diagnosed as "swollen glands" might be treated successfully in the youth of a patient and many years afterward the neck might be found to contain glands in a tuberculous state. It could be said sometimes of the tubercle bacillus that it "was not dead but sleepeth." Many of the unexplained deaths of old men were due to general tuberculosis, which had remained a latent infection from infancy.

SHOULD TUBERCULOUS PATIENTS MARRY?

The question whether tuberculous patients should be allowed to marry or to have children was discussed at the plenary session. Although there was a sharp diversity of opinion about preventing such marriages by law, it was generally agreed that persons suffering from tuberculosis in an advanced state should not marry and that the birth of children to a tuberculous woman, under certain conditions, should be prevented. Dr. J. G. Hislop of Western Australia, who had led the discussion from the medical aspect, said that it seemed that a dogmatic answer could not be given to the question but that each case should be dealt with on its merits. The main factors, so far as the female was concerned, were, first, the length of time that arrest of the disease had been known, and, second, the responsibilities and duties that the marriage would bring to her. When tuberculous activity was present but the infiltration was not gross, he would include both sexes and state that financial circumstances might sanction a marriage that, in other circumstances, one would view unfavorably. Dr. Hislop was in general opposed to marriage, but he considered that when radiologic and clinical tests had shown freedom from activity for two years it could be allowed. In making a decision on this point, he was swayed by the intelligence of the couple and their ability to see the reason for advice given them and to carry out that advice. Thus the question Should the tuberculous patient marry? must be answered by a No, except when the possibilities of arrest of the disease are considerable. With regard to the question of childbearing in a tuberculous woman, it was considered that every woman with an active lesion should be advised not to have a child. It would be a potential tuberculosis patient and might be infected by the mother in her last few months of life. Dealing with the public health aspect of tuberculosis and marriage, Dr. F. S. Hone of South Australia said that however successful impersonal and general administration might be in other departments of the campaign against tuberculosis, when doctors dealt with the marriage problems of the tuberculous they had to deal with practical problems affecting two individuals and their relatives and dependents. Legislation can be passed regarding the necessity for production of health certificates before marriage, but how far does that get us? The most successful campaign would

be that waged under the closest cooperation between medical practitioners and administrative officers who came into intimate contact with individuals and their practical problems. It was evident that if marriage was to be forbidden in every case of tuberculous infection a large proportion of the population would be shut out. Every patient must be dealt with as an individual case and the fullest consideration be given to all aspects of the patient's life. When there was clinical evidence of active disease with tubercle bacilli present in the sputum in individuals seen before marriage, they would be unanimous in forbidding marriage until the individual had ceased to be infective, and in most cases until three years later.

Dr. T. G. Wilson of South Australia gave a paper on the obstetric aspect. One of the most animated discussions of the congress followed, with fifteen speakers taking part. Some considered that doctors should try to retain a hopeful outlook for a young engaged couple and not face them with a "catastrophic no," while others considered that persons definitely tuberculous should refrain from marriage and from having children.

Dr. B. Hunt of Perth said that there was such a marked diversity of opinion among members that he would like a definite ruling from the meeting as to whether tuberculous patients should marry. The indisputable fact, he said, was that marriage was likely to lead to an increase of tuberculosis in the country, and it would be reasonable for the meeting to lay down a broad principle that it was opposed to marriage of a person in an advanced state of tuberculosis.

Marriages

DORAN THERMAN RUE, Orlando, Fla., to Miss Mildred Chambers of Chicago, June 28, in Deming, N. M.

DANIEL MINER ROGERS, New Britain, Conn., to Miss Clarinda Rosemary Moser of Rocky Hill, August 2.

BENJAMIN STALKER READ, Atlanta, Ga., to Miss Ethel Drake Houghton of Worcester, Mass., in June.

WADE HAMPTON ST. CLAIR JR. to Mrs. Mary Archer Ryland, both of Bluefield, W. Va., September 2.

VINCENT J. SIMMON, New York, to Miss Gertrude Mary Fowler of Tappan, N. Y., August 14.

HENRY VINCENT DAVIS, Chesapeake City, Md., to Miss Eloise Howard of North East, October 7.

MARTIN H. WENDKOS, Philadelphia, to Miss Florence C. Siris of Camden, N. J., October 3.

CHARLES C. ENGLEHART, Harrisburg, Pa., to Miss Mary Downey of Portage, Wis., July 14.

JAMES H. GRAMMER, Fort Worth, Texas, to Miss Margaret Neil Parker of Bryan, August 26.

JOHN T. HECKER, Cedar Rapids, Iowa, to Miss Grace L. A. Darling of Moline, Ill., June 12.

HORACE KENT KIBBIE to Miss Mildred Elinor Danforth, both of Fort Worth, Texas, July 28.

WILLIAM HAYS WINDLEY, Belhaven, N. C., to Miss Etta C. Carter at Washington, July 30.

IRA EDGAR FREYMAN to Miss Bertha Batt Bush, both of Weatherly, Pa., September 28.

ARTHUR EDWIN COOPER, Logan, Kan., to Miss Lillian Mary Fitch of Minneapolis, May 15.

DAVID JOSEPH GRAUBARD to Miss Florence Pearl, both of New York, August 10.

MARLIN W. HELFRICK, Belleville, Pa., to Miss Darlis Camp of Danville, June 26.

RALPH J. LOW to Miss Dorothea V. Montgomery, both of New York, recently.

HOBART O. DEATON to Miss Lois White, both of Fort Worth, Texas, August 25.

J. ROSS SIEGEL to Miss Eve Stienberg, both of Philadelphia, August 23.

JOHN A. HOFFA, Dushore, Pa., to Miss Amy Faul of Ambler, July 14.

Deaths

Chester Tilton Stone ⊕ New York; Long Island College Hospital, Brooklyn, 1915; member of an advisory board and captain of the Military Intelligence Bureau, Department of Justice, during the World War; on the staffs of the Bellevue Hospital, New York, "Bergen Pines," Ridgewood, N. J., and the Rome (N. Y.) State Hospital; at various times on the staffs of St. Bartholomew's Hospital, Woman's Hospital, St. Luke's Hospital, Post Graduate Hospital and the New York Hospital, New York, St. Lawrence State School, Ogdensburg, Long Island College Hospital, Greenpoint Hospital and Wyckoff Heights Hospital, Brooklyn; author of "Dangerous Age in Men"; at one time an associate editor of the *American Journal of Physical Therapy;* aged 50; died, August 27, in St. Luke's Hospital, of peritonitis, following perforation of the small intestine.

William Frederic Andrew George Rienhoff Sr. ⊕ Baltimore; Julius-Maximilians-Universität Medizinische Fakultät, Würzburg, Bavaria, Germany, 1883; member of the Southern Surgical Association, Society of Clinical Surgery and the American Association for Thoracic Surgery; fellow of the American College of Surgeons; past president of the Missouri State Medical Association and the Greene County (Mo.) Medical Society; served during the World War; author of "Principles and Foibles of Cancer Research in Regard to Etiology and Nature"; aged 79; died, August 29, at the Johns Hopkins Hospital, of heart disease.

Frederick Edwards Dilley, Chefoo, Shantung, China; Western Reserve University Medical Department, Cleveland, 1903; an Associate Fellow of the American Medical Association; fellow of the American College of Surgeons; for many years a medical missionary; superintendent of the Temple Hill Hospital; was a commissioner of the Red Cross for Western Siberia during the World War; formerly on the faculty of the Peiping Union Medical College, Peiping, China; at one time superintendent of the Peiping Hospital; aged 61; died, August 9, in Cleveland, of carcinoma of the stomach.

William Hamilton Long, Louisville, Ky.; Kentucky University Medical Department, Louisville, 1903; member of the Kentucky State Medical Association; clinical professor of anesthesia, University of Louisville School of Medicine; member of the Associated Anesthetists of the United States and Canada; past president and secretary of the Jefferson County Medical Society; on the staffs of the Louisville City Hospital, Children's Free Hospital and St. Anthony's Hospital; aged 57; was found dead, August 8, of an overdose of chloroform, self administered.

William Melville Robertson, Warren, Pa.; Trinity Medical College, Toronto, Ont., Canada, 1892; member of the House of Delegates of the American Medical Association in 1916; member of the Medical Society of the State of Pennsylvania; fellow of the American College of Surgeons; aged 74; formerly on the staffs of the Warren State Hospital and the Warren General Hospital, where he died, August 19, of peritonitis due to acute gangrenous appendicitis.

David Hendricks Bergey ⊕ Philadelphia; University of Pennsylvania Department of Medicine, Philadelphia, 1884; director of research in biology at the National Drug Company since 1932; formerly professor of hygiene and bacteriology at his alma mater; member and in 1915 president of the Society of American Bacteriologists; served during the World War; author of "Bergey's Manual of Determinative Bacteriology"; aged 76; died, September 5, of nephritis.

Otto Sutter ⊕ St. Louis; Beaumont Hospital Medical College, St. Louis, 1892; formerly clinical professor of abdominal surgery, National University of Arts and Sciences Medical Department, professor of gynecology and surgery, Beaumont Medical College, and on the faculty of the College of Physicians and Surgeons of St. Louis; at one time superintendent of the City Hospital; aged 73; died, August 1, of cerebral hemorrhage.

Rudolph Johannes Kremer, Chicago; Philipps-Universität Medizinische Fakultät, Marburg, Prussia, Germany, 1923; assistant professor of pathology, University of Illinois College of Medicine; served with the German Army during the World War; aged 40; director of the pathological laboratory of the Augustana Hospital, where he died, August 14, of mitral stenosis, rheumatic heart disease and pulmonary thrombosis.

Thomas Alexander Kenyon, New York; College of Physicians and Surgeons, Medical Department of Columbia College, New York, 1895; member of the Medical Society of New Jersey; served during the World War; on the staff of the

North Hudson Hospital, Weehawken; aged 66; died, August 2, in the Fitkin Memorial Hospital, Asbury Park, N. J., of a broken neck.

John William Kauffman, Reading, Pa.; Jefferson Medical College of Philadelphia, 1896; also a pharmacist; member of the Medical Society of the State of Pennsylvania; fellow of the American College of Surgeons; aged 64; for many years chief of obstetrics at Reading Hospital, where he died, August 4, of cerebral arteriosclerosis.

Sigo Ehrlich ✠ Bainbridge, Ga.; Vanderbilt University School of Medicine, Nashville, Tenn., 1915; also a pharmacist; on the staff of the Bainbridge Hospital; served during the World War; aged 49; died, August 23, in the John D. Archbold Memorial Hospital, Thomasville, of carcinoma of the rectum.

Harold Austin Miller ✠ Alameda, Calif.; Cooper Medical College, San Francisco, 1903; past president of the city board of health; for many years a member and president of the free library; aged 61; on the staff of the Alameda Sanatorium, where he died, August 13, of peritonitis following ruptured appendix.

Richard Bruce Pozer, Eriksdale, Manit., Canada; University of Manitoba Faculty of Medicine, Winnipeg, 1923; member of the Associated Anesthetists of the United States and Canada; served during the World War; aged 43; died, August 28, near Duluth, Minn., as the result of an automobile accident.

Charles Porter Sylvester ✠ Boston; University of Vermont College of Medicine, Burlington, 1899; for many years a member and formerly chairman of the Massachusetts State Board of Registration in Medicine; aged 59; died, August 6, at Rye Beach, N. H., of cardiorenal valvular disease and uremia.

Jacob Stacey John ✠ Bloomsburg, Pa.; Jefferson Medical College of Philadelphia, 1896; past president of the Columbia County Medical Society; fellow of the American College of Surgeons; president and chief surgeon of staff, Bloomsburg Hospital; aged 64; died, August 11, of angina pectoris.

Jesse Thomas McCartney, Barnesville, Ohio; Medical College of Ohio, Cincinnati, 1903; member of the Ohio State Medical Association; served during the World War; medical superintendent of the Barnesville General Hospital; aged 64; died, August 9, of cirrhosis of the liver.

Hans Moritz Lichtenstein, Winona, Minn.; Eberhard-Karls-Universität Medizinische Fakultät, Tübingen, Württemberg, Germany, 1890; member of the Minnesota State Medical Association; aged 70; died, August 6, in the Colonial Hospital, Rochester, of coronary thrombosis.

Leon Leopold Meyer, Memphis, Tenn.; Bellevue Hospital Medical College, New York, 1897; formerly assistant professor of surgery, University of Tennessee College of Medicine; served during the World War; aged 64; died, August 5, in the Methodist Hospital, of pneumonia.

Theodore Charles Erb, Boston; Harvard University Medical School, Boston, 1895; member of the Massachusetts Medical Society; for many years school physician; formerly instructor in obstetrics at Tufts College Medical School; aged 66; died, August 3, of heart disease.

Robert Coulter Walker, Santa Fe, N. M.; University of Cincinnati College of Medicine, 1924; at one time assistant professor of bacteriology at his alma mater; served during the World War; aged 43; died, August 12, of pulmonary and laryngeal tuberculosis.

William Allen Stoker, Centralia, Ill.; Medical College of Ohio, Cincinnati, 1885; formerly managing officer of the Kankakee State Hospital, Kankakee, Ill., and formerly superintendent of the Anna (Ill.) State Hospital; aged 73; died, August 22, of cerebral hemorrhage.

Carl Herbert Meissner, Oregon City, Ore.; Rush Medical College, Chicago, 1902; member of the Oregon State Medical Society; for many years a member of the school board; aged 57; died, August 21, in St. Vincent's Hospital, Portland, of coronary thrombosis.

Louis Martucci, Newark, N. J.; Regia Università di Napoli Facoltà di Medicina e Chirurgia, Italy, 1916; member of the Medical Society of New Jersey; served during the World War; aged 46; died, August 13, of acute nephritis and acute appendicitis.

Guy Hart Moates, Tarentum, Pa.; University of Nebraska College of Medicine, Omaha, 1923; member of the Medical Society of the State of Pennsylvania; aged 41; died, August 1, near Fort Hoyle, Md., of burns received in an airplane accident.

Rexford Jennings Morrell ✠ Elmira, N. Y.; University of Buffalo School of Medicine, 1927; on the staffs of the Arnot-Ogden Memorial Hospital and St. Joseph's Hospital; aged 32; was drowned in Lake Keuka, August 4, when his boat capsized.

Frederic Crounse, Altamont, N. Y.; Albany (N. Y.) Medical College, 1890; member of the Medical Society of the State of New York; served during the World War; aged 68; died, August 9, of cerebral hemorrhage and arteriosclerosis.

Edward Frederick Law ✠ Fairbury, Ill.; Rush Medical College, Chicago, 1903; past president of the Livingston County Medical Society; president of the township high school board of education; aged 63; died, August 5, of angina pectoris.

Ralph Henry Dunning ✠ Syracuse, N. Y.; Johns Hopkins University School of Medicine, Baltimore, 1911; served during the World War; for many years village health officer of Eastwood; aged 52; died, August 8, of coronary thrombosis.

Joseph Raymond Pugh ✠ Hammond, Ind.; Northwestern University Medical School, Chicago, 1920; on the staff of St. Margaret's Hospital; aged 43; died, August 16, as the result of a streptococcic infection of the throat.

Herbert Le Roy Walker ✠ Rock Island, Ill.; Keokuk (Iowa) Medical College, College of Physicians and Surgeons, 1904; on the staff of St. Anthony's Hospital; aged 56; died, August 11, of coronary thrombosis.

William Henry Weston, New York; College of Physicians and Surgeons, Medical Department of Columbia College, New York, 1878; aged 87; died, July 31, of carcinoma of the rectum, in the Good Samaritan Hospital.

Paul LeRoy, St. Jean, Que., Canada; Laval University Faculty of Medicine, Quebec, 1922; member of the Associated Anesthetists of the United States and Canada; aged 38; died, August 10, of heart disease.

Joseph Suley Wheeler, Santa Cruz, Calif.; L.R.C.S., and L.R.C.P., Edinburgh, Scotland, 1891; member of the California Medical Association; aged 81; died, July 22, of myocardial insufficiency.

Philip Tullius Johnson, Erie, Pa.; Homeopathic Hospital College, Cleveland, 1892; member of the Medical Society of the State of Pennsylvania; aged 77; died, August 3, of cerebral hemorrhage.

Frank Smith Post, Portland, Ore.; Western Pennsylvania Medical College, Pittsburgh, 1899; member of the Oregon State Medical Society; aged 65; died, July 12, of carcinoma of the bladder.

Cicero Frank Griffin, Suffolk, Va.; College of Physicians and Surgeons, Baltimore, 1893; member of the Medical Society of Virginia; aged 68; died suddenly, August 4, of coronary thrombosis.

William Franklin Race, Omaha; University of the City of New York Medical Department, New York, 1884; aged 79; died, July 16, in the Douglas County Hospital, of barbital poisoning.

William Hannum, Philadelphia; University of Pennsylvania Department of Medicine, Philadelphia, 1895; aged 66; died, August 2, in Bristol, of cerebral hemorrhage and arteriosclerosis.

Hugh J. Mulheron, Detroit; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1897; aged 64; died, July 27, at Rotterdam, Holland, while touring Europe.

Henry Charles L. Kloepper, St. Louis; St. Louis University School of Medicine, 1907; member of the Missouri State Medical Association; aged 56; died, August 6, of heart disease.

Hermann Ernst Schaef, London, Ont., Canada; Western University Faculty of Medicine, London, 1905; member of the Radiological Society of North America; aged 55; died, July 14.

Richard D. Talbott, Forth Worth, Texas; Memphis (Tenn.) Hospital Medical College, 1884; member of the State Medical Association of Texas; aged 76; died, August 4.

Andrew Jerome Harrington, Toronto, Ont., Canada; Victoria University Medical Department, Coburg, Ont., 1889; M.R.C.S., England, 1890; aged 76; died, August 5.

John Grant Lyman, New York; New York Homeopathic Medical College and Hospital, New York, 1891; aged 72; died, July 12, of arteriosclerosis and cerebral hemorrhage.

John H. Sowers, South Whitley, Ind.; Cincinnati College of Medicine and Surgery, 1889; aged 71; died, August 8, of paralysis agitans and chronic myocarditis.

Charles Alexander Durham Fairfield, St. Catharines, Ont., Canada; Trinity Medical College, Toronto, 1890; aged 73; died, July 4.

George M. Seigenthaler, Bethany, Mo.; American Medical College, St. Louis, 1877; aged 84; died, August 1, of chronic myocarditis.

Arthur Teninga ✠ Chicago; Rush Medical College, Chicago, 1919; aged 42; died suddenly, August 6, of coronary thrombosis.

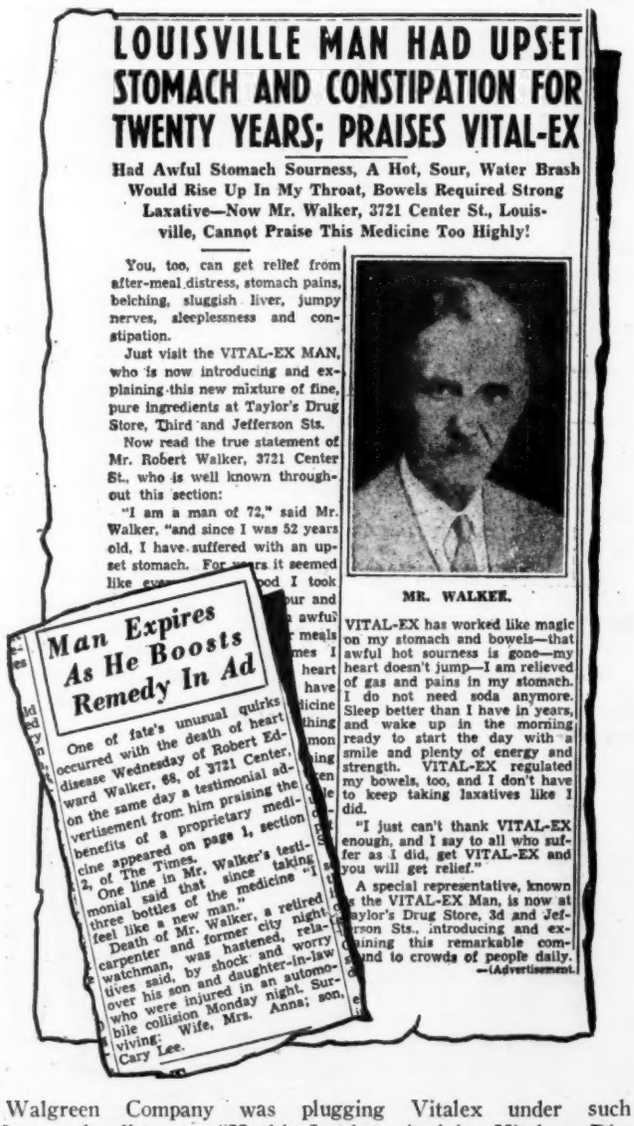
Bureau of Investigation

VITAL-EX

Death Notice of Vital-ex Testimonial Giver Appears on Same Day as Advertisement Boosting Nostrum

Recently the Louisville *Times* published a notice of death of a Mr. Robert Edward Walker, aged 68. On the same day appeared Mr. Walker's testimonial extolling the virtues of the "patent medicine" known as "Vital-ex." The news item relating to Mr. Walker's demise and the Vital-ex advertising heralding Mr. Walker's remarkable experience with this medicine are reproduced.

Vital-ex, apparently the same nostrum once advertised without the hyphen, has been exploited chiefly by the testimonial type of newspaper advertisement for "weak, run-down, tired out, ailing, nervous, rheumatic people." Several years ago the



LOUISVILLE MAN HAD UPSET STOMACH AND CONSTIPATION FOR TWENTY YEARS; PRAISES VITAL-EX

Had Awful Stomach Sourness, A Hot, Sour, Water Brash Would Rise Up In My Throat, Bowels Required Strong Laxative—Now Mr. Walker, 3721 Center St., Louisville, Cannot Praise This Medicine Too Highly!

You, too, can get relief from after-meal distress, stomach pains, belching, sluggish liver, jumpy nerves, sleeplessness and constipation.

Just visit the VITAL-EX MAN, who is now introducing and explaining this new mixture of fine, pure ingredients at Taylor's Drug Store, Third and Jefferson Sts.

Now read the true statement of Mr. Robert Walker, 3721 Center St., who is well known throughout this section:

"I am a man of 72," said Mr. Walker, "and since I was 52 years old, I have suffered with an upset stomach. For years it seemed like ever... food I took ...our and ...awful ...r meals ...mes I ...heart ...have ...dicine ...thing ...mon ...ning ...ten ...le ...d ...p ...S ...s ...c ...d ...e

MR. WALKER.

VITAL-EX has worked like magic on my stomach and bowels—that awful hot sourness is gone—my heart doesn't jump—I am relieved of gas and pains in my stomach. I do not need soda anymore. Sleep better than I have in years, and wake up in the morning ready to start the day with a smile and plenty of energy and strength. VITAL-EX regulated my bowels, too, and I don't have to keep taking laxatives like I did.

"I just can't thank VITAL-EX enough, and I say to all who suffer as I did, get VITAL-EX and you will get relief."

A special representative, known ...s the VITAL-EX Man, is now at ...aylor's Drug Store, 3d and Jef...rson Sts., introducing and ex...plaining this remarkable com...ound to crowds of people daily.

—(Advertisement.

Man Expires As He Boosts Remedy In Ad

One of fate's unusual quirks occurred with the death of heart disease Wednesday of Robert Edward Walker, 68, of 3721 Center, on the same day a testimonial advertisement from him praising the benefits of a proprietary medicine appeared on page 1, section 2, of The Times.

One line in Mr. Walker's testimonial said that since taking three bottles of the medicine "I feel like a new man."

Death of Mr. Walker, a retired carpenter and former city night watchman, was hastened, relatives said, by shock and worry over his son and daughter-in-law who were injured in an automobile collision Monday night. Surviving: Wife, Mrs. Anna; son, Cary Lee.

Walgreen Company was plugging Vitalex under such banner headings as "Health Leaders Acclaim Vital-ex Discovery." The health leaders in this instance were Dr. W. T. Welch, Dr. H. J. Perkins and Nurse Arline Hall. The advertisement was accompanied by a large photograph showing, presumably, Welch, Perkins and Nurse Hall grouped around a desk, gaping at a bottle of Vital-ex. When the Bureau of Investigation looked up the "health leaders," it was found that Dr. W. T. Welch held a diploma from the Hahnemann Medical College and Hospital, Chicago, dated 1914. No one by the name of H. J. Perkins was found as the holder of the degree of Doctor of Medicine. Nurse Hall was not identified.

In May 1937 the Buffalo Better Business Bureau, Inc., sent to the Bureau of Investigation an advertisement of Vital-ex which, they stated, had appeared in the Buffalo *Times* of May 19, 1937. In this Vital-ex advertisement a photograph of an elderly, spectacled individual appeared over the title "Dr. John Jackson, Buffalo, N. Y." The Buffalo Better Business Bureau reported: "Our immediate problem was to find out who Dr. John Jackson is. Our city directory and telephone directory listed no practicing physician of this name. We did find listed John J. Jackson, a chiropractor . . . On May 21 I called on John J. Jackson . . . and found him to be a rather young and very pleasant colored chiropractor—not the venerable person whose picture appears in the Vital-ex ad." Beneath the photograph of Dr. John Jackson was the heading: "Dr. Johnson Says." The consumer not trained in the wiles of "patent medicine" advertising might conceivably assume that Dr. John Jackson was a distinguished and well known physician of Buffalo and that it was he who was responsible for the statements of Dr. Johnson. Johnson might easily be read as Jackson. Since the Vital-ex label carries the caption "Dr. Johnson's Vital-ex," it is quite understandable that Dr. Johnson would state: "Never in my whole experience have I run across such a remarkable product as Vital-ex."

The United States Food and Drug Administration, however, did not share Dr. Johnson's views that Vital-ex was a remarkable product—assuming that the current Vital-ex is the old Vitalex. In October 1931 the government declared Vitalex to be adulterated and misbranded and worthless as a source of vitamin D. The article was alleged to be misbranded for the reason that the statement on the carton, "To which are added Vitamins . . . D." was false and misleading, since the article contained no vitamin D. According to the government report, analysis of a sample of Vitalex showed that it consisted of caffeine, salicylic acid, benzoic acid, small proportions of plant drugs including licorice, wild cherry, and a laxative drug, strychnine, valeric acid and volatile oils, alcohol and water.

It is not extraordinary that Mr. Walker should consider himself improved or that he should write a testimonial. But the testimonial and the death notice in the same issue are a satirical comment on the value of such testimonals.

MISBRANDED "PATENT MEDICINES"

Abstracts of Notices of Judgment Issued by the Food and Drug Administration of the United States Department of Agriculture

[EDITORIAL NOTE: The abstracts that follow are given in the briefest possible form: (1) the name of the product; (2) the name of the manufacturer, shipper or consigner; (3) the composition; (4) the type of nostrum; (5) the reason for the charge of misbranding and (6) the date of issuance of the Notice of Judgment—which may be considerably later than the date of the seizure of the product.]

Picri Stringent.—Alpha Laboratory, Inc., Chicago. Composition: Essentially common salt, sodium alum, boric acid, and a small proportion of picric acid. For vaginal disorders. Not antiseptic or germicidal, as represented. Fraudulent therapeutic claims.—[*N. J. 24626; April 1936.*]

Penor's (Dr.) Regulator Pills.—Dr. George D. Stoner, trading as the Dr. G. D. Stoner Co., Lakeland, Fla. Composition: Essentially aloe, ferrous sulfate, volatile oils including pennyroyal, and a trace of an unidentified alkaloid, coated with sugar and colored pink. For menstrual disorders and other female troubles. Fraudulent therapeutic claims.—[*N. J. 24627; April 1936.*]

Lambert's (J. O.) Syrup.—Dr. J. O. Lambert, Ltd., Troy, N. Y. Composition: Essentially chloroform, creosote, volatile oils including sassafras, menthol and wintergreen, with small amounts of epsom salt, a benzoate, sugar and water. For coughs, catarrh, bronchitis, asthma, etc. Fraudulent therapeutic claims.—[*N. J. 24631; April 1936.*]

Pheno-Cosan.—Whitney Payne Corp., New York. Composition: Essentially a mercury compound, a salicylate and tar, in an ointment base of fatty acids and water. For chronic eczema, wounds, sores, etc. Fraudulent therapeutic claims.—[*N. J. 24632; April 1936.*]

Va-Jel.—Alpha Laboratory, Inc., Chicago. Composition: Boric acid (1.2 per cent), gum tragacanth, lactic acid, glycerin, traces of oxyquinoline sulfate and oil of citronella, and water. Fraudulently represented as a "cure" for leukorrhea, venereal diseases, etc.—[*N. J. 24637; April 1936.*]

Vaj-Aseptic.—Alpha Laboratory, Inc., Chicago. Composition: Essentially common salt (67.8 per cent), baking soda (28.14 per cent), and small proportions of thymol and menthol. For leukorrhea, inflamed membranes, etc. Fraudulent representations.—[*N. J. 24637; April 1936.*]

Correspondence

NEW DRUG CONTROL LEGISLATION NEEDED

To the Editor:—The recent tragic deaths from elixir sulfanilamide have brought quite vividly to the public's attention the extreme danger of taking medicine without thorough experimental and clinical trial. The time seems ripe now for us to see that legislation is enacted and rigidly enforced against:

1. Any drug or medicine sold to the public not acceptable to the Council on Pharmacy and Chemistry of the American Medical Association.

2. Druggists and drug clerks prescribing "over the counter."

Any doctor or any one else prescribing drugs without knowledge of their property, actions, uses and contraindications should be condemned most heartily.

Why drugs in the U. S. Pharmacopeia, the National Formulary and New and Nonofficial Remedies are not adequate is quite a mystery to me. One can surely find the desired product in one of these three sources if one would only take the necessary time to look it up.

L. L. BEALL, M.D., Cleveland, Miss.

THE RECORD OF THE PATIENT'S HISTORY

To the Editor:—A well taken history is complementary to a well done physical examination. A skilled historian needs no special history form and, indeed, may rise above the handicap of a grossly inadequate one. The student, however, is much influenced in his career by the form with which he is first familiarized. It is interesting to observe with what tenacity the student in his subsequent professional career sticks to habits ingrained as an undergraduate. I wish to suggest a minor revision of the standard medical history form.

The standard history form is broadly divided into History of the Present Illness, Personal Medical History, and Family History. The divisions H. P. I. and P. M. H. may be justified on the basis of expediency but lead to the development of a narrow perspective with reference to the development of disease processes. I believe that the history of the present illness and the personal medical history ought to be incorporated under a single heading. Beginning chronologically with infancy, then developing the medical history year by year, and episode by episode, and leading up to current aspects of the case, leads to a concept of the case, and a picture of development of disease processes as a continuous whole. The classification History of the Present Illness is largely inspired by the psychology of a layman patient who dates the onset of his illness from his first incapacity, disability or symptom, even though the physician does carry the history of the present illness back somewhat more remotely.

The scientific ideal in history taking should, however, be an attempt to trace an illness back to its hereditary or remote environmental origins. For the present, it must suffice to trace an illness back to childhood or infancy. In an acutely developing hemiplegia where does the present illness begin? With the onset of aberrations of consciousness? With the onset of paralysis? This is rather loose medical thinking. The present illness began many years previously with occasional breathlessness on effort, occasional headache, transitory paresthesias. Limiting the history of the present illness to a recent dramatic episode of a long drawn out illness represents layman psychology. An adolescent has hepatomegaly, ascites and a positive blood Wassermann reaction. Did not his present illness begin with the generalized rash in infancy, followed by bone lesions and iritis? Did not the patient with mitral stenosis begin his present illness with repeated upper respiratory infections and anemia antedating by many years his first recent hemoptysis? In the adult with pulmonary tuberculosis did not his present illness begin in early childhood with recurrent febrile episodes, repeated respiratory episodes? In a case of acute cardiac infarction, the present illness did not develop recently with dramatic suddeness but rather with the slight dyspnea of many years ago, an occasional cough, occasional visual disturbances, and nocturia of some years past.

One might ask wherein lies any significant difference between the standard form subdivided into History of the Present Illness and Personal Medical History and a revised form embracing both of these under a single heading, Medical History (M. H.). Let me repeat again that in the case of the skilled historian this may be of no importance but for purposes of student training of considerable importance. A form helps establish a point of view and serves as a channel to direct the historian properly. That some change in the present form is necessary is evidenced by the following:

1. A review of a large number of hospital charts will show that the space allotted to the personal medical history averages about 5 to 10 per cent of the total history space.

2. The personal medical history usually consists of scant memoranda of the yes-no type under diseases and symptoms in contrast to the carefully written chronologically continuous narrative employed in the history of the present illness. Even granting that the greater length allotted the history of the present illness is for the development of symptoms which the patient demands be relieved, the scantiness of space and paucity of details in the average personal medical history a priori indicate an undue overemphasis on the history of the present illness. Facts essential to a clear conception of the evolution of a disease are slighted. If used subsequently for purposes of analysis, charts lack data indispensable in attempting to establish disease or symptom associations and etiologies.

The history pattern used by the psychiatrist could well serve as a model for a medical history. To the psychiatrist the apparently recent onset of mental symptoms is never anything but an episode in the development of psychologic processes whose roots run back to childhood and infancy. The psychiatrist thinks in terms of lifelong influences and a gradual unfolding of a personality. The identical point of view is applicable to somatic disease and should be imitated.

NATHANIEL HURWITZ, M.D., Philadelphia.

RESUSCITATION

To the Editor:—Why is it that clinicians who nowadays generally recognize—at least in words—the dependence of the healing art on the fundamental sciences nevertheless often in practice neglect the plain teaching of those sciences and follow the suggestions of commercial advertisements and sales agents?

A case in point is the treatment of babies who, because of asphyxia or narcosis, fail to breathe spontaneously at birth. Anatomy teaches that the lungs of such babies are atelectatic; that is, collapsed. Physiology teaches that for respiration to be developed the lungs must first be at least partially inflated. Yet time after time for the past twenty-five years, under various names, a certain type of apparatus for artificial respiration that obviously violates the principles of both these sciences has been more or less successfully foisted on clinicians.

Such apparatus is designed and expressly advocated not only to blow air into the lungs, which, if effective and not too forcible, would do good, but also to suck air out of the lungs, and thus to keep the lungs collapsed, or again render them atelectatic.

The first and most celebrated of these appliances was the pulmotor. Back in the years 1912 and 1913 the National Electric Light Association, in order to obtain advice regarding electric shock, and the United States Bureau of Mines, for

advice on resuscitation from asphyxiation by mine gases, requested the American Medical Association to recommend a commission for investigation of the subject of resuscitation. The commission that was appointed included Dr. W. B. Cannon, chairman, Dr. S. J. Meltzer, Dr. Joseph Erlanger, Dr. G. W. Crile and me. After extensive investigation of all known methods of artificial respiration, this commission made certain positive recommendations which have now for many years been generally adopted; but it expressly disapproved the pulmotor. And, as the disapproval was directed to the principle involved, it applies not only to the pulmotor but equally to all apparatus of its type, of which the latest is the E. & J. resuscitator, advocated in a recent article in THE JOURNAL (Martinez, D. B.: The Mechanical Resuscitation of the New-Born: A Report of 500 Cases, THE JOURNAL, Aug. 14, 1937, p. 489).

The main argument offered for all such appliances is a demonstration of their capacity alternately to inflate a rubber bag (simulating the lungs) and then to suck it flat. The reversal from blowing to sucking is automatically induced by the resistance of the bag when full or empty. Of this feature of such apparatus the commission reported:

> Inflation and deflation of a bag is deceptive, because the bag, unlike the air passages of the body, offers no resistance till full. As soon as the inspiratory blast meets an obstacle in the air passages, however, it is automatically cut off and turned into expiration, and thus frequently no efficient inspirations are performed. . . . The second harmful factor brought out by these experiments is the performance of expiration by suction. In normal respiration expiration is accomplished by a power that does not suck but drives out the air by the elasticity of the distended or compressed tissues, aided, sometimes, by muscular contraction. [After detailing its various lines of investigation in laboratory and clinic the commission report said:] Upon the basis of these observations, the conclusion was reached that the automatic mechanism of the pulmotor, although an ingenious technical contrivance, instead of assuring artificial respiration may interfere greatly with its efficiency, because the mechanism is liable to cut off inspiration prematurely.

In this verdict two other committees of investigation, one in 1918, the other in 1921, unanimously concurred (Report of the Commission on Resuscitation from Electric Shock, New York, National Electric Light Association, 1913. Report of the Committee on Resuscitation from Mine Gases, Technical Paper 77, U. S. Bureau of Mines, Washington, D. C., 1914. Work of the Commission on Electric Shock, editorial, THE JOURNAL, Nov. 1, 1913, p. 1637. Proceedings and Resolutions of the Third Resuscitation Commission, *Science* **48**:563 [Dec. 6] 1918. Drinker, C. K., and Redfield, A. C.: *J. Indust. Hyg.* **6**:109 [Aug.] 1923. Final Report of the Commission on Resuscitation from Carbon Monoxide Asphyxia, *ibid.* **6**:125 [Aug.] 1923). Evidence, which I have more recently obtained from obstetricians who have tested the E. & J. resuscitator on asphyxial or deeply narcotized babies, is to the effect that it frequently merely "clicks" from inspiration to expiration and back to inspiration in rapid succession without producing any movement of air in or out of the lungs. In some cases also autopsy has shown definite injury to the lungs.

General experience with the Drinker apparatus affords evidence which bears on this topic. It indicates that mechanical artificial respiration should be confined to a succession of inspirations and should not include forced expirations. When the body is enclosed in the Drinker apparatus, negative pressure induces inspiration in essentially the same way as does positive pressure over the face with apparatus of the pulmotor type. In the Drinker apparatus forced expirations by positive pressure are now generally omitted. And as negative pressure over the face acts similarly, it also should be omitted. Artificial respiration confined to inspirations, either with the Drinker or the pulmotor type of apparatus, if not too forcible, can do no harm; but forced expiration with either type of apparatus can. If then, the principal objection to the pulmotor, the E. & J. resuscitator and similar devices is to be removed, negative pressure should be omitted. It should be added that, among the cases in which the E. & J. resuscitator has been used, the latest to come to my knowledge is one in which a child had to be removed for a time from a Drinker apparatus. During this time the E. & J. resuscitator was substituted but the child died.

What then should be recommended for the resuscitation of the new-born? First and foremost, obstetricians should be far more conservative than is often the case now in administering narcotics shortly before delivery (Bundesen, H. N.; Dalms, O. A.; Fishbein, W. I., and Hamm, G. E.: Mortality of the New-Born in Chicago During 1935, with Special Reference to the Premature, THE JOURNAL, July 25, 1936, p. 270. Hess, J. H.: The Chicago City Wide Plan for the Care of Premature Infants, *ibid.*, Aug. 8, 1936, p. 400). There is ample evidence that such drugs act far more on the baby than on the mother (Henderson, Yandell: Respiratory Stimulants and Their Uses, THE JOURNAL, Feb. 6, 1937, p. 471). Doses that merely quiet her render the baby entirely apneic. Second, the passage of a soft catheter into the trachea of an apneic and flaccid baby is so simple an operation and insufflation by the Meltzer-Flagg technic (Flagg, P. J.: The Treatment of Postnatal Asphyxia, *Am. J. Obst. & Gynec.* **21**:537 [April] 1931) is generally so effective that there is little justification for any other procedure.

YANDELL HENDERSON, PH.D., New Haven, Conn.

RECURRENT LARYNGEAL NERVE

To the Editor:—I have always felt that in any formal terminology the primary purpose to be achieved was the clear and concise exchange of information and ideas. Unfortunately, anatomists have not always considered clinical convenience in setting up word lists, and clinicians, especially in America, seem to abhor formality in names.

At the present time the BNA, which is just being adopted in some clinical circles, is being either discarded or markedly altered in anatomic circles. The current suggested changes seem to follow nationalistic manners of thought, if not actual political boundary lines.

To me the statement in the editorial in THE JOURNAL, July 17, "Injury to the recurrent laryngeal nerve was recorded in 8.2 per cent of the cases. In no instance was it bilateral or permanent" is perfectly clear and anatomically accurate. I am a little surprised that Dr. John F. Quinlan of San Francisco finds grounds for objection (Injury to the Recurrent Laryngeal Nerve, THE JOURNAL, September 4, p. 809). Considering the matter of terminology, I quote for convenience from the comparative tabulation prepared by the committee of the American Association of Anatomists. The list was to be used by the association members in considering proposed changes. The numbers preceding the names are cross reference notations from the American committee's list. BNA refers to the Basle Nomenclature, BR to the present approved British list, and NK to the list of the Nomenklatur-Kommission. Nerve branches not concerned with the present discussion have been omitted.

	BNA
AAA	
171: 21	N. recurrens
171: 25	N. laryngeus inferior
171: 26	Ramus anterior
171: 27	Ramus posterior

	BR
171: 21	N. laryngeus recurrens
171: 25	Rami pharyngei
171: 26	Rami laryngei

	NK
171: 21	N. recurrens
171: 25	N. laryngeus caudalis
171: 26	Ramus ventralis
171: 27	Ramus dorsalis

Since the designations "right" and "left" are omitted, the structures so named are normally bilateral. The right recurrent laryngeal nerve (to follow the language of the editorial and the BR) "recurs" about the right subclavian artery, near

its point of origin. It is closely related or may be in contact with the innominate artery and, I would presume, could be sufficiently distributed by intrathoracic changes to cause vocal paralysis. Occasionally, owing to peculiarities in the embryonic transformations of the aortic arches, the right nerve does not recur but is distributed directly from the vagus nerve shortly below the superior laryngeal nerve. This condition occurs once in 500 cases in an English series; Adachi found one case in 516 Japanese cadavers. The incidence is much higher in the Negro. I see from one to three cases a year in our cadaveric material here in Philadelphia.

I regret that we cannot, for practical purposes, attain a common anatomic terminology, but this difficulty even with the present multiplicity of commissions is not as great as it has been in some epochs of anatomy.

OSCAR V. BATSON, M.D., Philadelphia.
Professor of Anatomy, University of Pennsylvania Graduate School of Medicine.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

METRAZOL TREATMENT OF INSANITY

To the Editor:—1. What is the nature of the metrazol treatment of mental disease? 2. Over how long a period does it extend? 3. What is the immediate effect on the patient? 4. What is the anticipated result of such a treatment? 5. What risk to the patient's health, mental or physical, is involved? 6. What degree of permanence can be expected from any resultant improvement?

M.D., Illinois.

ANSWER.—1. The metrazol treatment can be classed as a shock treatment and was first developed by Meduna of Budapest, who calls it a "convulsive therapy." The convulsions are induced by rapid intravenous injections of metrazol, which has a pharmacologic action similar to camphor and usually produces typical epileptiform seizures with doses of from 3 to 10 cc. of the 10 per cent solution.

2. According to Meduna, the treatment is given twice a week and usually consists of from ten to twenty convulsions.

3. The immediate effect does not seem to differ from that produced by the ordinary epileptic seizure and is usually followed by transitory confusion and somnolence, after which marked improvement of the patient's mental status may supervene.

4. Meduna's reports compare favorably with those for the insulin shock treatment; Friedman of Buffalo has recently reported an improvement in thirty of forty cases treated by this method.

5. Sustained periods of confusion may occasionally follow the seizure, but there is usually no permanent deleterious effect on the patient's mental status. The most frequent complications are those attendant on ordinary seizures; namely, luxations, fractures or physical traumas and less frequently cardiovascular accidents.

6. The treatment is too new to give adequate information on the frequency of relapse.

ULTRAVIOLET RAYS FOR DESTROYING RINGWORM IN SHOES

To the Editor:—It has been suggested that the orificial applicator of my cold quartz generator might serve in the sterilizing of the shoes of my patients suffering from the various fungous infections of the feet. Would this procedure be of any value in the prevention of recurrence?

M.D., Michigan.

ANSWER.—It is true that ultraviolet rays of the proper wavelengths are efficient in destroying bacteria and fungi. As to whether they would prevent recurrences of eczematoid ringworm of the feet from organisms remaining in the shoes is doubtful.

The applicator would have to be held long enough in every recess of the shoe and one would have to make certain that there is no fold anywhere in the lining or leather in order to expose the entire inside surface of the shoe. Even were that possible, it is still doubtful that all the fungi would be killed. Scrapings have been made from the inside of shoes and it has been found that cultures of fungi can be made from some of the relatively deeper parts. It is well known, of course, that ultraviolet rays will penetrate only within a fraction of a millimeter of such materials as leather, and for this reason the organisms not on the surface of the inside of the shoe would still remain viable to start a fresh infection.

It would be more practical to use chemicals to accomplish the same end. The formaldehyde fumigation method is perhaps the most simple and yet efficient method for this purpose.

COLD PRESSOR TEST FOR STABILITY OF VASOMOTOR SYSTEM

To the Editor:—The cold pressor test of Hines and Brown mentioned near the top of the second column, page 933, in THE JOURNAL, March 20, sounds most interesting. Can you give a brief description of the test?

GEORGE M. SHEAHAN, M.D., Quincy, Mass.

ANSWER.—The cold pressor test, devised by Hines and Brown, was first reported in the *Proceedings of the Staff Meetings of the Mayo Clinic* **7**:332 (June 8) 1932. Additional significant reports are:

Hines, E. A., Jr., and Brown, G. E.: *Ann. Int. Med.* **7**: 209 (Aug.) 1933; *Am. Heart J.* **11**: 1 (Jan.) 1937.
Briggs, J. F., and Oerting, Harry: *Minnesota Med.* **16**: 481 (July) 1933.

The technic of the cold pressor test is simple and the procedure is applicable to office use. The subject is permitted to rest in a recumbent position while several determinations of the arterial tension are made until a basal level is reached. The hand of the arm opposite to that on which the sphygmomanometer cuff is applied is then placed in ice water (4 C.) well up the wrist. The arterial tension is determined at the end of thirty seconds and again at sixty seconds. The hand is then removed from the ice water and readings of the arterial tension are made every minute until the tension returns to its previous basal level. The maximal tension is usually observed thirty seconds after the exposure to cold, although it may be occasionally delayed. Some subjects find the immersion of the hand in ice water painful, but there is no relationship between such sensitivity and the response of the arterial tension. It is the degree of rise in the diastolic tension which is most significant, although the changes in the systolic tension should be likewise observed. The two significant values are (1) the rise in the diastolic tension or "response" and (2) the level of the maximum diastolic tension observed.

The reaction of the arterial tension under these conditions is remarkably constant in any single individual; variation on repeated studies averages about 10 per cent. The types of response observed fall into five groups: 1. In normal persons the average rise of the diastolic tension is about 10 mm. of mercury. The return to previous basal levels is prompt. 2. In hypertensive individuals with little or no arteriolar sclerosis the rise is from 25 to 40 mm. As these patients have higher than normal basal levels, the maximum diastolic readings are often very high. Despite this, no untoward effects of the test have been reported. The fall in the tension to previous levels is often somewhat delayed. 3. Hypertensive patients with varying degrees of arteriolar sclerosis give varying responses; from 10 to 30 mm. rise is usual. 4. Arteriosclerotic patients without hypertensive arterial disease respond as do normal persons. 5. Hyperreactive individuals with normal basal levels of blood pressure react with an exaggerated rise in both the systolic and diastolic tensions. In these patients the diastolic usually rises from 20 to 30 mm. It is this last group that is perhaps the most interesting. These patients should be considered as being in a "prehypertensive state" or as having "potential hypertension." The transition from such potential hypertension to hypertensive arterial disease has been observed a number of times. The present concept of hypertensive arterial disease lays great stress on the intrinsic constitutional vulnerability of the patient as an important factor in the etiology. The cold pressor test reveals inherent instability of the vasomotor mechanism and thus indicates, often prior to the development of persistent hypertonia, the vulnerability of the individual. Ayman (*Arch. Int. Med.* **53**:792 [May] 1934) and others have shown that this hyperreactive type of response is much more frequent in children from families in which hypertension exists in one or both parents than in others. Dieckmann and Michel (*Arch. Int. Med.* **55**:420 [March] 1935) demonstrated those patients with preexistent renal and/or vascular injury gave exaggerated reactions early in pregnancy and that such reactions were a warning of the likelihood of later intoxication. These tests were made early in pregnancy, when the urinary examination gave normal results. The reactions in preeclamptic patients

were variable. In chronic nephritis in pregnancy the test caused violent upheavals of the arterial tension.

Many further clinical studies are necessary before all the significant implications of this test are thoroughly understood. It is especially necessary to follow for many years the younger hyperreactive patients so that the development of hypertensive arterial disease can be better studied in the early stages. In summary it may be concluded that this procedure offers much useful clinical information regarding the equilibratory mechanism of the circulation and that its application for the detection of prehypertensive individuals is a most fertile field.

ADDISON'S DISEASE

To the Editor:—In Queries and Minor Notes in THE JOURNAL, August 21, appeared an inquiry by M.D., Michigan, concerning a test for and the treatment of Addison's disease. The answer is defective in two respects: First, the response of the patient to a salt-poor diet is mentioned as a diagnostic test. It is said that failure of this test does not exclude Addison's disease. The point should have been made that, as Wilder and his co-workers have stated (*Proc. Staff Meet., Mayo Clin.* **11**: 281 [April 29] 1936), "it is important to regulate the potassium content of the diet if withdrawal of salt is used as a diagnostic test for Addison's disease; with a low intake of potassium (1.6 Gm. or less) symptoms may be slow in developing or even indefinitely postponed, while the restriction of sodium chloride may provoke serious relapse if the intake of potassium is high (4 Gm. or more)." Second, the discussion of treatment fails even to mention the low potassium diet used first by the Mayo Clinic. Reports by Wilder and his associates, Webber (*Maine M. J.* **27**: 235 [Dec.] 1936), and by me (to be published in the *Southern Medical Journal*) indicate that a low potassium diet plus administration of sodium salts may suffice to maintain patients in good condition.

ROBERT J. HOAGLAND, M.D., Fort Sam Houston, San Antonio, Texas.

COMMENT.—With regard to the control of the potassium content of the diet in patients with Addison's disease, the point of the communication is well taken as far as it applies to the treatment of severe cases of Addison's disease. The work of Wilder and his associates points clearly in this direction, although their clinical studies were complicated by various controllable and uncontrollable factors, some of which are mentioned in their articles (R. M. Wilder and others: *Proc. Staff Meet., Mayo Clin.* **11**:273 [April 29] 1936; *Arch. Int. Med.* **59**:367 [March] 1937). In the first of these articles, it is said that "attention will have to be paid to the potassium content of the diet prescribed for patients who have severe Addison's disease." The reply in THE JOURNAL assumed that the patient would be kept on a normal diet (including the usual potassium content) during the salt withdrawal test. No one knows what effect excessive administration of potassium may have on the outcome of this test in very mild or early cases of Addison's disease. It is obvious, however, that if the fear of provoking a serious relapse during the restriction of sodium chloride should lead physicians to reduce the potassium intake during the test, the diagnostic value of the test would be considerably diminished for that very reason.

In the discussion of the treatment, reference to the low potassium diet was omitted because the question referred to the treatment for "an early case of Addison's disease." Even a superficial familiarity with the labor of preparing and the unpleasantness of ingesting a diet low in potassium should make one hesitate to prescribe such a diet except when it is seriously indicated; namely, in severe cases of Addison's disease which fail to respond adequately to the usual therapeutic measures.

MASTURBATION IN WOMEN

To the Editor:—What is the treatment of masturbation in a woman who is a graduate nurse?

M.D., New York.

ANSWER.—The treatment is different for the unmarried than for the married woman. It is especially difficult in a trained nurse, who has access to all sorts of erotic literature and who is often in intimate contact with young male patients, not to mention young male hospital interns.

In all women, whether married or not, it is important to remove all local genital irritations, such as intertriginous and eczematous conditions about the genitals. It is immaterial whether the local condition is the cause or consequence of the masturbation. Even if not the cause, it serves to keep up the habit and to attract the attention of the patient to her genitals, thus delaying a cure. Gymnastic exercises which might bring into play thigh friction, such as sliding down the banisters, sliding down a slippery pole, or bicycle and horseback riding, should be avoided. Operations on the genitals are of no value unless some distinct condition aside from the habit is present. Erotic literature and especially erotic movies and plays should be forbidden. The maxim in treatment is to replace the habit. Any outdoor hobby, such as swimming, golfing or tennis, is of value. One must not talk in vague hints but put the issue squarely before the patient and try to develop her will power and self control. Hard work, no matter of what nature, is of great value. Any inclination to be alone should be discouraged. These directions apply to single and to married women alike.

For single women it is absolutely essential to avoid such statements as "nothing will cure your condition except marriage" or "the habit will leave you when you get married" and the like. In the first place the statement is absolutely false, and in the second place the young girl may take the hint and indulge in illicit coitus. It is more important to emphasize, especially to a trained nurse who knows something about the anatomy and physiology of the female genitals, that masturbation develops those areas in the brain which are connected with the external genitals at the expense of those areas connected with the vagina. As a consequence, the ordinary act of coitus with its vaginal friction will not give as much pleasure or response as masturbation and so, if she marries later, the result might be frigidity. This explanation to a trained nurse may act as a deterrent to the habit. Long marriage engagements should be discouraged, for they keep up in both parties a state of sexual erethism which encourages masturbation. Especially harmful is spooning, "necking parties" and similar experiences. For a brief period the internal administration of bromides will help to tide over a severe urge. Tea, coffee and alcoholics must be avoided absolutely.

In married women the condition is often started or kept up by the practice of withdrawal in the husband. Here the husband interrupts the act of coitus before he reaches his own orgasm and almost necessarily before the wife has had hers. As a result the wife is left in an excited, unsatisfied condition and often either she or her husband titillates her clitoris to bring on the orgasm. This practice must be absolutely interdicted and the husband must be instructed about this as well as the wife and furthermore he should be instructed in the art of normal coitus. The avoidance of tea, coffee and alcoholics as well as the occasional use of bromides is the same as in single girls.

SIGNIFICANCE OF WASSERMANN REACTION

To the Editor:—The statement on page 609 of THE JOURNAL, August 21, that "the Wassermann reaction is absolutely diagnostic of syphilis, with the exception of yaws," cannot go unchallenged. Should this statement be taken literally, it will undoubtedly condemn many innocent people as being affected with syphilis. If you will refer to an article published by me on the diagnosis of syphilis in the April 1926 issue of *Southwestern Medicine* you will find the following: "It is not specific. Yaws, a tropical disease caused by a spirochete, will give a positive test; fever will at times give a positive test and when repeated after the fever is gone will yield a negative reaction; constipation may give a positive test; jaundice at times gives confusing reactions. Tuberculosis may give a positive reaction although it will usually give a stronger reaction with tuberculous antigen." This quotation referred to the Wassermann test and the article went into detail as to the efficiency and reliability of the Wassermann test at that time, and I have had no occasion to alter my opinion of it since.

H. M. PURCELL, M.D., Phoenix, Ariz.

ANSWER.—After consultation with several clinical and laboratory authorities on the diagnosis of syphilis, the following answer appears to represent the majority opinion of those best qualified to discuss this subject: Three types of false positive reactions must be distinguished: technical false positive reactions—those due to some error in the performance of the test, which occur in every laboratory, no matter what the test used, and which are not confirmed on testing a second specimen; biologic false positive reactions, caused by the presence in serum or spinal fluid of actual reagin in the absence of syphilitic infection and in which both the Wassermann and the flocculation test are persistently positive; and, finally, what may be termed the anomalous false positive reaction, in which only the Wassermann reaction is positive, the flocculation reaction is persistently negative, and the patient presents no clinical evidence of syphilis. Technical false positive reactions constitute the majority, and hence the reliability of the laboratory is the first factor that enters into the interpretation. The next most important factor is the sensitivity of the test, which depends not only on the type of test used but in some instances on a deliberately obtained increase in ease of reactivity.

The general opinion is that there are only five diseases other than syphilis which may produce persistently false positive serologic tests in a high percentage; namely, yaws, leprosy, malaria, trypanosomiasis and relapsing fever. Positive tests are sometimes obtained in tuberculosis, malignant disease, fever, jaundice, pneumonia, Hodgkin's disease, malignant endocarditis, infectious mononucleosis and other conditions, but the interpretation may fail to take into account the possibility of technical false positives or the fact that the patient actually had a symptomless latent syphilis. Furthermore, the majority of the false positives are of the doubtful variety. It is thus

clear that the Wassermann and flocculation tests for syphilis are not absolutely diagnostic of syphilis, although with the exception of the five diseases previously mentioned they can usually be so considered when allowance is made for the technical factors mentioned.

References:

Eagle, Harry: The Laboratory Diagnosis of Syphilis, St. Louis, C. V. Mosby Company.

Cummings, H. S.; Hazen, H. H.; Sanford, A. H.; Senear, F. E.; Simpson, W. M., and Vonderlehr, R. A.: The Evaluation of Serodiagnostic Tests for Syphilis in the United States, *Ven. Dis. Inform.* **16**:189 (June) 1935.

"UNRESOLVED?" PNEUMONIA

To the Editor:—A woman, aged 51, always in good health until February 1, came down with grip, followed by bronchopneumonia, which behaved typically for two or three weeks. Since that time there have been occasional days when her temperature remains normal, but usually it is between 99 and 101 F. Her sputum shows pneumococci and streptococci but no tubercle bacilli. X-ray examination of the chest shows a fairly large area of unresolved pneumonia in the lower left portion with possibly a little fluid below the axilla but none posteriorly; a smaller area in the lower right part of the chest is not resolved. A needle failed to locate fluid. There is a persistent racking cough with profuse thin yellowish sputum loaded with pus cells. Nothing that I have been able to do has changed the situation in the past month. Kindly let me know what one can do to hasten resolution in such a condition, for nobody seems to think that there is much except general care that affords any hope of relief, and the patient, as well as her physician, is getting terribly tired of the whole situation. ROBERT W. SHEARMAN, M.D., Brooklyn.

ANSWER.—For the complete diagnosis of this case it is essential to determine the nature of what is termed "unresolved pneumonia." It is necessary to exclude an infected atelectasis or suppuration in a pulmonary lobule due to retention from productive inflammation in its bronchiolar wall. The possibility of a localized empyema draining through a bronchus should be excluded. Information concerning the bacterial etiology of the bronchopneumonia is lacking and may still be supplied by cultural study of the pus. If the "unresolved?" pneumonia is due to continued infection it may be relieved, depending on the cause, either by autogenous vaccines or by roentgen therapy.

Careful studies should be conducted to determine the anatomic nature of the lesion. This may require either roentgenography with iodized oil or bronchoscopy.

HISTAMINE TEST AND GASTRIC SECRETION

To the Editor:—In THE JOURNAL, April 24, in an article entitled "Gastric Carcinoma and Peptic Ulcer," Dr. Cranston Holman gives a technic of stomach analysis by the use of histamine hydrochloride hypodermically. He did not give the interpretation of the readings of this test. Can this method be successfully used instead of the test meal analysis of the gastric contents in neurosis and peptic ulcers? If so what is normal and what is abnormal? An attempt has been made to use it at St. Mary's Hospital but the readings have been quite high compared to those of the test meal analysis. Please give a statement as to its use in all cases of gastric analysis and also how to interpret the readings especially in normal persons.

JAMES A. HILL, M.D., Jefferson City, Mo.

ANSWER.—This question is answered best by referring to the article by A. L. Bloomfield and W. S. Polland entitled "The Diagnostic Value of Studies of Gastric Secretion" (THE JOURNAL, May 4, 1929, p. 1508) and the review of the literature on histamine as a stimulus in gastric secretion by L. M. Gompertz and M. G. Vorhaus (*J. Lab. & Clin. Med.* **11**:14 [Oct.] 1925). In brief, the method can be used successfully instead of the other types of test meals in the analysis of the gastric contents in neurosis and peptic ulcers. The question as to what is "normal" may be answered in part by the following quotation from Bloomfield and Polland: "In general, it may be said that most normal persons have a maximum ten minute secretory volume of not under 15 cc. and not over 35 cc. and a total acidity of not under 90 and not over 125. The highest acidity we have ever encountered was 150; the greatest ten minute secretory volume was 60 cc. The entire range as regards both acid and volume may, however, be encountered in persons without other evidence of gastric disease."

All these statements are important. In the first place, as Dr. A. J. Carlson pointed out a number of years ago, all known pathologic variations of gastric secretion are depressions. The normal stomach may secrete as highly acid gastric juice and apparently as large a quantity of gastric juice as is seen in disease. Disease depresses the secretion if it affects it at all. The second important point is that all variations from high grade secretion to complete (histamine) anacidity are encountered frequently in persons without other evidence of gastric or other disease.

The greatest advantage of the histamine test is that a histamine proved anacidity is almost surely true anacidity, for histamine is the most potent known stimulus for gastric secretion. The most important thing to know clinically with regard to gastric secretion is whether or not the stomach is able to secrete acid. If it is able to secrete acid, the patient does not have pernicious anemia (Sturgis, C. C.; Isaacs, Raphael; Goldhamer, S. M.; Bethell, F. H., and Farrar, G. E.: Blood: A Review of the Recent Literature, *Arch. Int. Med.* **55**:1001 [June] 1935) or posterolateral sclerosis of the spinal cord (Oliver, T. H., and Wilkinson, J. F.: Achlorhydria, *Quart. J. Med.* **2**:431 [July] 1933); if the stomach is unable to secrete acid, the patient does not have a benign peptic ulcer (Palmer, W. L.: The Mechanism of Pain in Gastric and Duodenal Ulcers: I. Achlorhydria, *Arch. Int. Med.* **38**:603 [Nov.] 1926); Fundamental Difficulties in the Treatment of Peptic Ulcer (THE JOURNAL, Nov. 18, 1933, p. 1604).

It is self evident that the old classification of "normal free acidity" in terms of clinical units, as from 20 to 40, of "hyperacidity" as above 40 and of "hypo-acidity" as below 20, is incorrect and should be discarded. The important and perhaps the only significant point is whether or not the stomach is able to secrete acid.

REINFECTION OR RELAPSE OF SYPHILIS

To the Editor:—A patient contracted syphilis in January 1925, and three months after the disappearance of the chancre started treatment, at which time the blood Wassermann reaction was 4 plus. Between January 1925 and 1928 the patient had thirty-six doses of neoarsphenamine, 106 mercury inunctions and twenty-four doses of bismuth subsalicylate in oil, plus indeterminate amounts of iodide. In 1928 after these varied kinds of intermittent treatment the reaction of the patient's blood was constantly negative and the spinal fluid examination was negative once. He remained well until January 1937, at which time he started treatment for a hard indurated, irregular ulcer of the scrotum the size of a quarter (24 mm.), with inguinal adenopathy. The stained slides from the lesion showed a few spirochetes. The blood Wassermann and Kahn reactions were both 4 plus. Spinal fluid and darkfield examinations were omitted. The lesion healed quickly with neoarsphenamine. 1. Was the lesion a recurrence of the original infection or a reinfection? 2. What procedures should have been done to determine whether this is a reinfection or a recurrence? 3. Are there any authenticated cases of reinfection with syphilis, and if not, is there any definite proof of immunity to the disease? 4. If this diagnosis cannot be definitely determined, that is, recurrence or a reinfection, what would be the best plan of treatment? Should the patient be treated as having a seropositive primary lesion (provided cardiovascular and neurosyphilis are ruled out) or should he be treated as having a later type of lesion? 5. Should neoarsphenamine be used?

H. J. BECK, M.D., Lamar, Colo.

ANSWER.—The evidence presented suggests that the patient had a reinfection. The period of twelve years between the "first" and the "second" infection favors a reinfection. It is rare to see a patient with a relapse and a positive darkfield examination twelve years after the chancre.

Stokes lists seventeen indisputable, eight probable and five possible criteria of reinfection. The case under discussion complies with seven of the eight points for the "probable" criteria of reinfection; namely, (1) indisputable first infection, (2) negative clinical and serologic examinations for more than one year, (3) second chancre at a different site from that of the original one, (4) no signs of activity of the first chancre, (5) positive darkfield examination on the second chancre, (6) an adjacent bubo and (7) a positive blood Wassermann reaction. The eighth criterion, that is, the appearance of "secondaries" twenty days or more after the appearance of the chancre, was not noted in the description.

There are no procedures which can now be done to prove that this was a reinfection. However, there are several factors which if elicited would make the argument for reinfection more potent. It is essential to locate and determine whether the partner, the suspected source of the second infection, has evidence of acute syphilis. Note whether the incubation period from the time of exposure to the appearance of the chancre was within the normal range. A patient suspected of having a reinfection may be allowed to go untreated to note whether he develops "secondaries" following the second chancre; this, of course, is not possible in the case under discussion at this time. The appearance of a bubo and a positive darkfield examination for Spirochaeta pallida on aspiration of the bubo are further evidence that the patient has a reinfection.

There are some authentic cases of reinfection, although most of the suspected cases are in reality examples of a recurrence or relapse. Definite proof of immunity to the disease is lacking, although there is presumptive evidence that some persons do have a definite resistance to syphilis, which minimizes the severity of the course of the infection or produces spontaneous cure.

As far as treatment is concerned, it actually makes little difference whether this is a case of reinfection or of recurrence, because the patient should be treated intensively as having

early syphilis. The use of the continuous system of treatment, employing arsphenamine or neoarsphenamine and a bismuth compound, is recommended for such a patient. He should receive a minimum of thirty injections of arsphenamine and fifty of a bismuth compound.

Neoarsphenamine is slightly more toxic and has a slightly lower therapeutic index than arsphenamine. Accordingly, it should be given in somewhat smaller doses but with more injections to the course. Eight injections of neoarsphenamine should constitute a course, with the dose ranging from 0.3 to 0.7 Gm., depending on the age, sex, weight and general status of the patient.

OCCLUSION OF DIGITAL ARTERIES

To the Editor:—A printer, aged 46, has been troubled for the past four years with a gradually increasing uncomfortable sensation of numbness and tingling and coldness in the finger tips. The sensation is blunted so that he is unable to operate the keyboard of a linotype, which requires an accurate sense of pressure. He has also noted a tired feeling in the calves of the legs, without pain, after walking. General physical examination is rather negative. The past history is that of one of usual normal health. There is no diabetes. The blood Wassermann reaction is negative. The blood pressure examination reveals a systolic blood pressure of 100-110, with a diastolic pressure of 80. Blood count reveals 5,000,000 red blood cells and 6,000 white blood cells. Blood smear reveals nothing abnormal. X-ray examination revealed several ulcerated teeth and one devitalized tooth without ulceration. An injection intramuscularly of 0.0125 cc. of mecholyl resulted in vasodilatation of the skin all over the body and of the arms and hands down to the proximal phalanges, leaving the distal portions of both hands in the same color, which appeared blanched in comparison. I could not appreciate any change in temperature, nor did the patient feel any warmer in the tips of the fingers after the injection, as he did in other parts of the body. I am thinking of treatment with alternating suction and pressure. What about the possibility of an occupational cause? What about an allergic cause? What other lines of treatment should be considered? What about the practicability of a ganglionectomy? M.D., Cleveland.

ANSWER.—The data presented suggest an organic arterial occlusion of the digital arteries and perhaps of the arteries of the lower extremities, although nothing has been said about the absence or diminution of the pulses of the foot and popliteal space. Sudden drop in skin temperature at certain levels or a difference of temperature between symmetrical areas of the lower extremities should be looked for. Focal infection originating in the teeth, tonsils and prostate must be eradicated. A twenty-four hour specimen of urine can be examined for lead and arsenic. In interpreting the results, the upper limits of normal lead excretion in Cleveland must be known, as this varies in different communities. Should the lead excretion be high, a cautious deleading with ammonium chloride and a change in occupation are advisable. Smoking, if practiced, should be absolutely prohibited. Sufficient water intake up to ten to twelve glasses of water with an addition of 10 Gm. (150 grains) of sodium chloride in the form of tablets helps to increase the water content of the blood. If there is no evidence of arteriosclerosis by palpation or x-ray examination of the pedal arteries, a course of intravenous injections of triple typhoid vaccine may be started. The doses may be kept so low that chills and high temperatures are avoided. A course consists of from ten to twelve treatments.

If after such a conservative regimen there is no definite improvement, a sympathectomy can be considered. Whether or not this operation is going to be successful depends chiefly on the proper selection of the case, which requires considerable experience and should be left to the judgment of a surgeon familiar with this type of work. He will test the capacity of the vascular bed to dilate with physical or chemical vasodilators and will perform a complete sympathetic denervation by preganglionic section.

Results of suction and pressure treatment in this type of case have not been definite.

VARICOCELE

To the Editor:—What is the possibility and incidence of acute varicocele arising suddenly without preexisting signs or symptoms such as pain, red streaks and swelling? Kindly include etiologic factors, types and locations of acute varicoceles.

BERNARD L. ROBBINS, M.D., Miami Beach, Fla.

ANSWER.—Varicocele is a dilatation, elongation and tortuosity of the spermatic veins. It is a common condition in young men and is much more frequent on the left side than on the right. In all probability this is due to the fact that the left spermatic vein enters the left renal vein at a right angle, making venous return more difficult than on the right. Varicocele may be symptomless for a long time unless attention is directed toward the lesion. When that happens, a peculiar hypochondriac state develops and mental symptoms of varying degree may follow. Of course when the varicocele becomes inordinately large a distressing sense of weight, pressure in the loin, in the groin and in the back is perfectly understandable. Red streaks and swelling, as mentioned, are not encountered in cases of varicocele unless a phlebitis of the spermatic veins is present, which is rare.

The actual cause of varicocele is the incompetence of the valve at the orifice of the left spermatic vein followed by reflux of blood from the vena cava. This is brought about by increased intra-abdominal pressure transmitted along the unvalved spermatic vein. There may be one or several anterior trunks and one posterior trunk, which anastomose freely with one another and constitute the pampiniform plexus. These trunks often have valves, but if the valve at the renal vein is incompetent they gradually become incompetent too.

There are two possible answers to the question raised by the inquiry: either there has existed a fully developed varicocele, which was asymptomatic and to which sudden attention has been called by an injury; or a sudden rise in venous pressure, following an unusual strain, has actually opened up a venous segment in the pampiniform plexus and has thus aggravated a preexisting, congenital defect. As no clinical data are supplied in this hypothetical case, any further statement would be of speculative nature.

CRAVING FOR CELERY

To the Editor:—I am writing with regard to a patient who has a craving for celery. She can go about three days without eating it and then gets very nervous and feels that she must have celery. If she goes three or four days without eating any celery she must eat a whole bunch to be relieved of her symptoms. After eating the celery she is very calm. She says she could eat celery every day. She has tried various other vegetables and greens and has also taken medicine, but none have taken the place of celery. Her mother and grandmother were both morphine addicts. However, her mother acquired the habit after the patient was born. The habit was acquired by giving morphine for pain. Her mother was cured of the habit. I should like to know whether anything can be suggested that would be of benefit or give me light on this subject.

C. J. LARSEN, M.D., Stoneham, Mass.

ANSWER.—A patient with this particular craving has never been encountered by the writer, although of course other examples of unusual craving have been seen. Frequently they are of considerable significance. For instance, before the discovery of Whipple, Minot and Murphy regarding the significance of liver in pernicious anemia, physicians occasionally encountered patients with pernicious anemia who had a craving for liver. A craving for salt in patients with Addison's disease is frequently encountered, in which the administration of large amounts of salt has been found to be beneficial, and a craving for foods that supply vitamins, encountered in men who have been subsisting on a vitamin-poor diet. Numerous other examples might be cited. There is no obvious substance that celery could provide that might otherwise be lacking. It would seem wise to respect the craving and allow as much celery to this patient as she would care to eat. Large amounts of celery would probably not do her any harm, and to withhold the food under the circumstances might be harmful.

ASCITES

To the Editor:—Please give me the quickest and best treatment for ascites in a person 60 years of age. How can one determine whether it is of portal or nephritic origin? Will intravenous mercurial preparations do any good in an ascites of portal origin?

A. R. WANAMAKER, M.D., Hamburg, Iowa.

ANSWER.—Ascites is due to so many different conditions that one can give but a short summary of some of the more important causes in this reply. By the same token it is impossible to give any adequate suggestions as to therapy, because no data are submitted to furnish a clue as to the cause of the ascites in this patient. Portal obstruction is not a simple entity. Any condition interfering with the flow of blood in the portal circulation, of intrahepatic origin, as in the cirrhosis, or of extrahepatic origin from anything occluding the portal vein, as a thrombosis, or compressing it, as tumors or enlarged lymph nodes, may lead to the development of ascites. Chronic peritoneal irritation from chronic inflammation and neoplasms may also cause ascites. Congestive heart failure with engorgement and cirrhotic changes in the liver may be accompanied by ascites. This condition, however, may be primary or it may be a complication, frequently a terminal event in one or another form of chronic nephritis or nephrosclerosis in the course of chronic hypertension.

Ascites is a rare symptom of acute nephritis and its consideration evidently does not enter here. The diagnosis of nephritis requires not alone urinalyses but a study of the blood chemistry and renal function. Relief of the ascites may be obtained by paracentesis of the abdomen, under sterile precautions, the needle entering in the midline about 3 or 4 cm. above the symphysis. A local anesthetic, as 0.5 or 1 per cent

procaine hydrochloride, may be used with advantage. This procedure may be repeated with the return of ascites. The medical means of relief of ascites are, first, if the condition is cardiac, an attempt to improve cardiac action. The mercurial diuretics, of which salyrgan or mercupurin is an example, may be given intravenously or deep intramuscularly, in doses beginning with half an ampule, subsequently increased to a full ampule every few days. At the same time the patient should get 0.65 Gm. of ammonium chloride three times daily. The response may be immediate, in a few hours, or it may not occur for several hours and continue for from two to even three days. Albuminuria is no contraindication to its use. The use of a mercurial diuretic may be continued indefinitely. Recently suppositories have been introduced which in some cases seem to produce considerable diuresis.

TREATMENT OF PRURITUS ANI

To the Editor:—Have there been any recent developments in treatment of severe chronic pruritus ani? What are considered the best solutions for injection?

FRANK C. GREEN, M.D., Chillicothe, Ill.

ANSWER.—In cases of severe chronic pruritus ani it is important to see that the rectum is normal; polyps, fissures, hemorrhoids and large skin tags should be removed. An area of dermatitis can be injected through multiple punctures with a fine hypodermic needle, punctures being half an inch apart and injecting below the dermis about 2 minims (0.12 cc.) of absolute alcohol in each puncture. The area injected is then covered with zinc oxide paste and instructions are given the patient to avoid rubbing with bath towels, sponges, toilet paper and other irritating or traumatizing agents. The alcohol causes a numbness of the region for about three months and with suitable hygiene of the skin most patients are either cured or at least receive definite relief.

SULFANILAMIDE SOLUTIONS

To the Editor:—Enclosed please find one of the clippings now on the front page of the daily press relative to deaths from a solution of sulfanilamide. I have on my desk a three ounce sample of solution of sulfanilamide with citra-lactate, dispensed by Donley-Evans and Company, St. Louis. Do you have any information relative to this product?

M.D., St. Louis.

ANSWER.—None of the products of the Donley-Evans Company have been accepted by the Council on Pharmacy and Chemistry. The Council has not accepted any solution of sulfanilamide. There is no evidence available to indicate that any preparation of sulfanilamide is stable in solution form. In order for the Council to recognize a solution of sulfanilamide, the product must be stable and, at the same time, the solvent must be nontoxic in the doses given. Possibly a satisfactory solvent has been developed. However, there is no evidence to indicate that this is the case. Until such time as a product of this type is devised, physicians will do well to prescribe only accepted brands in powder and tablet form.

TOXICITY OF *di*-CHLORO-*di*-FLUOROMETHANE (FREON)

To the Editor:—Can you furnish me with information regarding the toxicity of Freon, the gas commonly used in air conditioning? I should like to know the symptoms of toxicity and the relative concentration of the gas necessary to produce symptoms. Are the effects of this gas cumulative?

ALBERT H. MANN, M.D., Texarkana, Ark.-Texas.

ANSWER.—Freon is stated to be *di*-chloro-*di*-fluoromethane, K-12. This refrigerant is discussed in a publication based on hearings before the fire department of the city of New York and embracing materials prepared by "Freon" manufacturers on one side and E. T. Williams and John Kenlon on the other. This report is controversial but does contain an extensive bibliography. *Di*-chloro-*di*-fluoromethane, although compounded from highly toxic substances, is in itself substantially nontoxic. It is substantially free from irritant properties and apparently acts only as an asphyxiant. When it replaces oxygen in the atmosphere, it leads to asphyxiation solely by displacing oxygen. Apparently a high concentration, such as 20 per cent of the total atmosphere, may be required in order to bring about noteworthy injury under ordinary circumstances.

This compound may readily decompose, particularly when affected by heat, leading to the presence of new compounds of much higher toxicity. It has been stated that "freon" on decomposition yields hydrogen chloride, hydrogen fluoride, chlorine and phosgene. Of these substances phosgene is perhaps the most important as a toxic agent, if in appreciable quantities in a respired atmosphere, though the toxicity of fluorine is not to be discounted. So far as known, no cumulative effects are produced by the prolonged inhalation of this gas. However, the technical data available, based on animal experimentation, are somewhat lacking in extended observations. All in all, at this time it appears possible to rate this gas as one of the least hazardous of the substances used in mechanical refrigeration in absence of conditions (such as fire) that may lead to decomposition. The perfect refrigerant has not been discovered.

MYOSITIS OSSIFICANS

To the Editor:—Please advise me whether there has been any new treatment for progressive myositis ossificans. I have a patient with it and she does not seem to respond to any treatment.

M.D., Louisiana.

ANSWER.—No effective therapy for progressive myositis ossificans is known. Tutunjian and Kegerreis (Myositis Ossificans Progressiva, *J. Bone & Joint Surg.* **19**:503 [April] 1937) have recently reviewed the literature and reported one case in detail. They have suggested the administration of beryllium carbonate, which is known to reduce the inorganic phosphorus content of the serum. Beginning with doses of 3 Gm. a day and later increasing this to 6 Gm. daily, they gave their patient a total of 200 Gm. without noting any untoward symptoms but with no definite evidence of improvement or decalcification of either the bones or the abnormal deposits. The authors express the opinion that more favorable results might be obtained if the subjects are available prior to the full development of the osseous system and if the treatment could be carried out over a much longer period.

ANCIENT "SCHOOL" OF MEDICINE

To the Editor:—I am seeking information about a school of physicians known as "methodist," which existed about the middle of the fifteenth century and which discarded observation and held to the pure deductions of reason and logic.

J. W. YANCY, M.D., Brenham, Texas.

ANSWER.—No reference has been found to any school of physicians known as "methodists" in the fifteenth century. Perhaps the Greek school which flourished in the second century A. D. is meant. References to this school are:

Lund, F. B.: Greek Medicine (Clio Medica), New York, Paul B. Hoeber, Inc., 1936, p. 72 ff.
Allbutt, T. C.: Greek Medicine in Rome, London, 1921, p. 192 ff.
Meyer-Steineg, T.: Das medizinische System der Methodiker, Jena, 1916 (Jenaer medizin-historische Beiträge, No. 7-8).
Edelstein, L.: Methodiker, in Pauly-Wissowa, Real-Encyclopädie der classischen Altertumswissenschaft, Supplementband VI, Stuttgart, 1935, cols. 358-373 (philosophical background of the school).
Sigerist, H. E.: The Great Doctors, New York, Norton & Co., 1933, pp. 56-67.

SUBCUTANEOUS OR INTRAMUSCULAR INSULIN

To the Editor:—Recently in two articles on the treatment of schizophrenia by insulin shock I have read that the insulin injections should be given intramuscularly. My teaching has been that insulin should not be given intramuscularly and I find statements to the latter effect in recent textbooks. In one recent textbook is the statement that "if insulin is injected into the muscles necrosis occurs and scar tissue forms." Can you explain this apparent discrepancy?

E. J. KELLEHER, M.D., Kenilworth, Ill.

ANSWER.—In diabetic clinics everywhere the invariable rule, so far as we know, is to advise the subcutaneous administration of insulin as the method of choice. Hence there is probably little available information as to the local effect of present-day insulin when given intramuscularly. It must be remembered that the insulin now distributed by pharmaceutical houses is a purer preparation than that in the early days following its discovery.

It is possible that those who have had considerable experience in the treatment of schizophrenia with insulin shock may have made further observations on the point in question, but no published statement has come to our attention. It may be noted that in a recent report from one clinic in this country (J. A. M. A., **109**: 1246 [Oct. 16] 1937) insulin for the shock treatment was given subcutaneously.

VIOSTEROL (A. R. P. I. PROCESS)

To the Editor:—Will you be good enough to throw some light on the viosterol (A. R. P. I. Process) in oil, which was covered in an advertisement that I read in your issue of September 18. I am not quite clear as to whether or not this viosterol is made by a new process and if so how it effects its results on the human body. Please omit name.

M.D., Illinois.

ANSWER.—This product was fully discussed in the report of acceptance by the Council on Pharmacy and Chemistry published in THE JOURNAL October 2, page 1126. The report is based on a large mass of toxicologic, pharmacologic and clinical material submitted to the Council with the viosterol (A. R. P. I. Process).

Medical Examinations and Licensure

COMING EXAMINATIONS

STATE AND TERRITORIAL BOARDS

Examinations of state and territorial boards were published in THE JOURNAL, October 30, page 1475.

NATIONAL BOARD OF MEDICAL EXAMINERS

NATIONAL BOARD OF MEDICAL EXAMINERS: *Parts I and II.* Examinations will be held in all centers where there is a Class A medical school and five or more candidates who wish to write the examination, Feb. 14-16, May 9-11 (limited to a few centers), June 20-22, and Sept. 12-14. Ex. Sec., Mr. Everett S. Elwood, 225 S. 15th St., Philadelphia.

SPECIAL BOARDS

AMERICAN BOARD OF DERMATOLOGY AND SYPHILOLOGY: *Written examination for Group B applicants* will be held in various cities throughout the country in April. *Oral examination for Group A and B applicants* will be held at San Francisco in June. Sec., Dr. C. Guy Lane, 416 Marlboro St., Boston.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: *Written examinations and review of case histories for Group B candidates* will be held in various cities of the United States and Canada, Feb. 5. *Applications must be filed at least sixty days prior to date of examination. General oral, clinical and pathological examinations for all candidates (Groups A and B)* will be conducted in San Francisco, June 13-14. *Application for admission to Group A examinations must be on file before April 1.* Sec., Dr. Paul Titus, 1015 Highland Bldg., Pittsburgh (6).

AMERICAN BOARD OF OPHTHALMOLOGY: San Francisco, June 13. *All applications and case reports, in duplicate, must be filed at least sixty days before the date of examination.* Sec., Dr. John Green, 3720 Washington Blvd., St. Louis, Mo.

AMERICAN BOARD OF ORTHOPEDIC SURGERY: Los Angeles, Jan. 14-15. Sec., Dr. Fremont A. Chandler, 6 N. Michigan Ave., Chicago.

AMERICAN BOARD OF PATHOLOGY: New Orleans, Dec. 2-4. Sec., Dr. F. W. Hartman, Henry Ford Hospital, Detroit, Mich.

AMERICAN BOARD OF PEDIATRICS: Los Angeles, Nov. 7; Boston, Nov. 14, and New Orleans, Nov. 30. Sec., Dr. C. A. Aldrich, 723 Elm St., Winnetka, Ill.

AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY: New York, Dec. 29-30. Sec., Dr. Walter Freeman, 1028 Connecticut Ave., N.W., Washington, D. C.

AMERICAN BOARD OF RADIOLOGY: San Francisco, June 10-12. Sec., Dr. Byrl R. Kirklin, 102-110 Second Ave. S.W., Rochester, Minn.

Washington July Report

Mr. Dave S. Cohn, secretary, Department of Licenses, reports the written examination held in Seattle, July 12-14, 1937. The examination covered 7 subjects and included 70 questions. A grade of not less than 60 per cent in any subject was required to pass. Forty-five candidates were examined, all of whom passed. Twenty-six physicians were licensed by reciprocity and 6 physicians were licensed by endorsement. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
University of Arkansas School of Medicine		(1935)	68.5
College of Medical Evangelists		(1937)	86,* 86.7
Stanford University School of Medicine		(1936)	82.7
University of Colorado School of Medicine		(1936)	79.8, 84.1
Georgetown University School of Medicine		(1936)	84.1
Northwestern University Medical School		(1936)	86.5, (1937) 80, 82.5, 82.7, 84.1,* 84.1, 84.7, 88*
School of Medicine of the Division of the Biological Sciences		(1936)	84.8,* (1937) 83.4
Indiana University School of Medicine		(1936)	77.5, 79.7, 86.7
University of Kansas School of Medicine		(1929)	76, (1936) 83.2
University of Michigan Medical School		(1933)	83.7
Washington University School of Medicine		(1936)	86.5
Creighton University School of Medicine		(1936)	79.1, 79.8, 84.7, 90.4
University of Nebraska College of Medicine		(1922)	81.8, (1936) 77.5
Columbia University College of Physicians and Surgeons		(1936)	81.7
New York Homeopathic Medical College and Flower Hospital		(1931)	80.2
Western Reserve University School of Medicine		(1934)	80.5, (1935) 84.2
University of Oregon Medical School		(1935)	86.2, (1936) 84.2, 86.8
Jefferson Medical College of Philadelphia		(1935)	86.2
University of Pennsylvania School of Medicine		(1936)	80.1
Woman's Medical College of Pennsylvania		(1915)	85
Marquette University School of Medicine		(1937)	82.8
McGill University Faculty of Medicine		(1935)	85.2, (1936) 86.4
Regia Università degli Studi di Perugia. Facoltà di Medicina e Chirurgia		(1935)	88.1†
Universität Zürich Medizinische Fakultät		(1936)	83.5†

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
Northwestern University Medical School		(1934)	Minnesota, (1935) Colorado, (1936)* California
State University of Iowa College of Medicine		(1932),* (1933), (1936)	Iowa
Tulane University of Louisiana School of Medicine		(1931)	Texas
Johns Hopkins University School of Medicine		(1935)	Maryland
University of Minnesota Medical School		(1933)	Minnesota
St. Louis University School of Medicine		(1936)	Missouri
Washington University School of Medicine		(1933), (1936)*	Missouri
University of Nebraska College of Medicine		(1935), (1936, 2)	Nebraska
University of Oregon Medical School		(1934) (1935), (1936) California, (1935) Utah, (1936)* Louisiana, (1936) Oregon	Texas,
University of Pennsylvania School of Medicine		(1933)	Wisconsin
University of Texas School of Medicine		(1930)	Texas
University of Virginia Department of Medicine		(1936, 2)	Virginia
University of Wisconsin Medical School		(1936)	Oregon

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
College of Medical Evangelists		(1936), (1937, 3)	N. B. M. Ex.
Washington University School of Medicine		(1930)	N. B. M. Ex.
University of Wisconsin Medical School		(1936)*	N. B. M. Ex.

* License has not been issued.
† Verification of graduation in process.

Delaware July Report

Dr. Joseph S. McDaniel, secretary, Medical Council of Delaware, reports the written examination held at Dover, July 13-15, 1937. The examination covered 10 subjects and included 100 questions. A grade of 75 per cent in each subject was required to pass. Sixteen candidates were examined, 14 of whom passed and 2 failed. Five physicians were licensed by reciprocity. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
University of Colorado School of Medicine		(1933)	82.5
Yale University School of Medicine		(1934)	78.4, 79.5
University of Illinois College of Medicine		(1936)	76.7
University of Maryland School of Medicine and College of Physicians and Surgeons		(1936)	80.7
Ohio State University College of Medicine		(1936)	82.2
Hahnemann Medical College and Hospital of Philadelphia		(1936)	82.9, 84, 85.3, 88.1
Jefferson Medical College of Philadelphia		(1936)	82.5, 84.3
Temple University School of Medicine		(1936)	83
University of Pennsylvania School of Medicine		(1936)	79.7

School	FAILED	Year Grad.
Harvard University Medical School		(1933)
Temple University School of Medicine		(1936)

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
Yale University School of Medicine		(1930)	Connecticut
Indiana University School of Medicine		(1918)	Indiana
Jefferson Medical College of Philadelphia		(1930)	Penna.
University of Pennsylvania School of Medicine		(1931)	Penna.
University of Virginia Department of Medicine		(1922)	Dist. Colum.

California Reciprocity and Endorsement Report

Dr. Charles B. Pinkham, secretary, California State Board of Medical Examiners, reports sixty-three physicians licensed by reciprocity and 16 physicians licensed by endorsement from July 9 through Oct. 2, 1937. The following schools were represented:

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
University of Colorado School of Medicine		(1936)	Colorado
Georgetown University School of Medicine		(1929)	Michigan
Emory University School of Medicine		(1936)	Georgia
Chicago College of Medicine and Surgery		(1911)	Montana
Loyola University School of Medicine		(1927)	Illinois
Northwestern University Medical School		(1931) (1935)	Illinois, Montana
Rush Medical College		(1904) (1905)	Iowa, Hawaii, (1907) Illinois
University of Illinois College of Medicine		(1932), (1934)	Illinois
Indiana University School of Medicine		(1926), (1934)	Indiana
Medical College of Indiana		(1902)	N. Dakota
State University of Iowa College of Medicine		(1924), (1929), (1932)	Iowa, (1933) Washington
University of Kansas School of Medicine		(1932), (1936, 2)	Kansas
Tulane University of Louisiana School of Medicine		(1928) (1935)	Arizona, Colorado, (1926), (1936) Louisiana
Baltimore Medical College		(1910)	Massachusetts
Johns Hopkins University School of Medicine		(1927) (1936)	New York, Maryland
Harvard University Medical School		(1933)	Kansas
Detroit College of Medicine		(1911)	Michigan
University of Michigan Medical School		(1926) (1929)	Missouri, Michigan, New York
University of Minnesota Medical School		(1931), (1936)	Minnesota
St. Louis University School of Medicine		(1934)	Missouri
Washington University School of Medicine		(1933, 2)	Missouri
University of Nebraska College of Medicine		(1918), (1919), (1923), (1927, 2), (1929), (1936)	Nebraska
University and Bellevue Hospital Medical College		(1903)	Utah
University of Rochester School of Medicine		(1934)	New York
Ohio State University College of Medicine		(1934)	Ohio
Toledo Medical College		(1907)	Ohio
University of Oregon Medical School		(1935)	Oregon
Hahnemann Medical College and Hospital of Phila.		(1930) (1936)	Pennsylvania, Maryland
Jefferson Medical College of Phila.		(1926) N. Y., (1935)	Ohio
University of Tennessee College of Medicine		(1935)	Arizona

Vanderbilt University School of Medicine.....(1935) Tennessee
Baylor University College of Medicine.....(1933), (1934), (1935) Texas
Queen's University Faculty of Medicine.....(1919) Colorado
Ludwig-Maximilians-Universität Medizinische Fakultät, München .....(1920) Illinois
National University of Athens School of Medicine..(1904) Massachusetts

LICENSED BY ENDORSEMENT

School	Year Grad.	Endorsement of
College of Medical Evangelists	(1935)	N. B. M. Ex.
University of California Medical School	(1932)	U. S. Navy
Yale University School of Medicine	(1931), (1932)	N. B. M. Ex.
University of Illinois College of Medicine	(1917)	U. S. Navy
College of Physicians and Surgeons of Baltimore	(1915)	U. S. Navy
Johns Hopkins University School of Medicine	(1933)	U.S.P.H.S.
Harvard University Medical School	(1931)	N. B. M. Ex.
University of Nebraska College of Medicine	(1926)	N. B. M. Ex.
Columbia College, College of Physicians and Surgeons	(1895)	U.S.P.H.S.
University and Bellevue Hospital Medical College	(1914)	U. S. Navy
Western Reserve University School of Medicine	(1929)	N. B. M. Ex.
University of Oregon Medical School	(1930)	U. S. Navy
University of Pennsylvania School of Medicine (1922),	(1930)	N. B. M. Ex.
Vanderbilt University School of Medicine	(1916)	U. S. Navy

Book Notices

Physical Diagnosis: The Art and Technique of History Taking and Physical Examination of the Patient in Health and in Disease. By Don C. Sutton, M.S., M.D., Associate Professor of Medicine, Northwestern University School of Medicine, Chicago. Cloth. Price, $5. Pp. 495, with 306 illustrations. St. Louis: C. V. Mosby Company, 1937.

As a basic textbook for the academic teaching of physical diagnosis, this one has many excellent features and few faults. It is mainly practical, in parts concise, and easy to read. Illustrations are for the most part well chosen, especially the few charts and the roentgenograms. The first portion of the book is made up of an excellent section on the art of medicine and the history of physical diagnostic methods. The author is to be commended on his interesting presentation of this material. The chapter on the taking of a history is rather brief, particularly the portion dealing with gastro-intestinal diseases. Many statements in this chapter are dogmatic, yet some would not be accepted by every internist and surgeon. The section on the heart covers 150 pages and, with the introductory chapter, comprises half of the entire book. It is obvious that the author is particularly interested in cardiology. The thirteen pages dealing with cross-sectional anatomy of the heart do not seem essential in a book of this type. While the chapter seems too detailed for inclusion in so general a work, even its length does not detract from its value. The chapter dealing with examination of the thorax is well written. The illustrations are clear and well placed. The section on abdominal examination is adequate but that on neurologic investigation is rather sketchy. It is to be regretted that the author failed to stress the importance of rectal examination. It seems that it should not be performed only "when indicated" but rather that it should be considered a routine measure. On the whole, however, there are few faults in this well planned book on a difficult but fundamental subject.

Personality and the Cultural Pattern. By James S. Plant, M.D., Director, Essex County Juvenile Clinic. Cloth. Price, $2.50. Pp. 432. New York: Commonwealth Fund; London: Oxford University Press, 1937

Dr. Plant has had a number of years' experience doing child guidance work; in fact, he was one of the earliest child guidance experts in this country. His clinic in Essex County, N. J., is a spendid example of work that can be done, yet Dr. Plant professes to be thoroughly disappointed in the psychiatric approach although he does not say so directly. He emphasizes that the individualization of the case and the so-called case history method, looking into the dynamisms of the individual, whether due to heredity or to environment, are in themselves inadequate. What one needs if one is to make an adequate study of any case is the careful analysis of, first of all, the personality as it is seen and, second, the influence of cultural and sociological processes on the individual. The earliest part of this volume deals with the general thesis emphasizing that the psychiatric approach, so long as it deals only with the individual without relation to its environment, is more or less sterile. The way that this aspect has been phrased does not give it any tinge of newness, for mental hygienists have for years stressed the fact that other approaches beyond the mere interview with the patient and the reconstruction of the patient's past life through conventional methods are necessary and that one must study the complete cultural pattern. But Plant goes beyond this. He formulates a systematized way of thinking about the whole problem. He points out, for instance, that truancy is not a single experience, that it does not arise from a single cause but that there are a number of rather vague causes which the child himself perhaps does not recognize in which the truancy has its inception. Various cultural interrelations are thoroughly worked out. He discusses certain angles of personality study which in themselves are not new but which have an enlightening and stimulating effect when studied from his point of view. The last part of the book emphasizes the picture presented today by the various sociological agencies: the family, the social agency, the church, the school, the court and industry. At these Plant looks in a rather critical light, perhaps not so much novel as thoroughly recrystallizing and clarifying. While one does not agree with many of his statements, since the book is highly theoretical and not based on the cold scientific method, which perhaps is not really applicable here, opinions on the subject are open to diversification; yet one cannot deny that the volume is stimulating. One would scarcely consider a modern mental hygienist, child guidance psychiatrist or any one else interested in the relationship of the social problem of mental health properly equipped without some acquaintance with this work.

Gastroscopy: The Endoscopic Study of Gastric Pathology. By Dr. Rudolf Schindler, Associate Clinical Professor of Medicine, University of Chicago. With a preface by Dr. Walter Lincoln Palmer, Associate Professor of Medicine, University of Chicago. Cloth. Price, $7.50. Pp. 343, with 185 illustrations. Chicago: University of Chicago Press, 1937.

This new volume in English should be welcomed by those members of the American profession who are interested in gastroscopy. It is not a translation of the author's earlier Lehrbuch und Atlas der Gastroscopie, published in 1923, but is completely new. The book contains twenty-one chapters, the first eight of which are devoted to historical, anatomic, technical and physiologic fundamentals. Chapter 10, on gastritis, is of special interest. The author maintains that 50 per cent of all patients examined are found to have gastritis, and he regards it as the commonest of all gastric lesions. His simple classification of the chronic nonspecific forms of gastritis into superficial, atrophic and hypertrophic commends itself. To this group is added postoperative gastritis. Chapters 14, 18 and 20, on the postoperative stomach, the relationship between gastroscopy and surgery and the relationship between gastroscopy and the x-rays, are of interest to the surgeon and the roentgenologist.

Schindler minimizes the danger of gastroscopy to the patient when the flexible instrument, fitted with a rubber finger tip, is used. He feels that gastroscopic examination should be a routine method of the gastro-enterologist just as cystoscopy should be a routine method of the urologist. The amount of air to be blown into the stomach is one of the most delicate problems of gastroscopic technic, in his experience, and he properly stresses the difficulties of orientation. The production of an image that corresponds more nearly in size with reality in all parts of the stomach is still an unsolved optical problem. He frankly admits that ulcers of the pylorus and duodenum cannot be seen gastroscopically and that the lesser curvative of the antrum often remains hidden from view. And yet it is at these sites that gross benign and malignant lesions, usually readily demonstrated by the competent roentgenologist, are almost exclusively situated. He lists a variety of twelve conditions in which he feels that gastroscopy is regularly indicated, including duodenal and gastric ulcer and gastric carcinoma. His justification for advising gastroscopic examination of a patient with duodenal ulcer, especially if an operation is under consideration, is that there may be an associated gastric ulcer or gastritis present. "In the differentiation of benign and malignant gastric ulcer, gastroscopy is, in my experience, second only to microscopic examination." But his description of a lesion under the caption "carcinomatous ulcer" is really that of a good sized ulcerating carcinoma.

The author's observations on gastro-intestinal hemorrhage are pertinent in large measure. He feels that this condition is an important indication for endoscopic examination, for often the x-ray examination does not reveal the cause, which may

be an actual ulcer demonstrable only by the gastroscope, or a severe hemorrhagic gastritis, hemorrhagic erosion or a benign tumor. Postoperative hemorrhages are often due to a gastritis. Such examination should be made after the bleeding has stopped. The gastroscopic appearance and differential diagnosis of all types of ulceration of the gastric mucous membrane are summarized in chapter 13. The gastroscopic determination of the exact size or depth of an ulcer is found to be difficult. Gastroscopically it is usually easy to follow exactly the process of ulcer healing, and the author has observed that the crater is often found to persist even after the niche has disappeared on x-ray examination.

Schindler states that in gastritis all parts of the stomach are affected, but all gastroscopists agree that the body is much more frequently involved than is the antrum. "The concept of a special antrum gastritis arose apparently from the fact that the specimens obtained by surgical resection consist chiefly of the antral portion of the stomach." The author feels that the most common reason for failure in gastric surgery is the development of a "terrible and incurable chronic gastritis." This does not appear to occur in well adapted and rhythmically contracting stomas. He has observed that the surgeon, as a rule, does not appreciate the importance of gastroscopy as does the internist who has seen the interior of the stomach through a gastroscope.

In the diagnosis of carcinoma or in the determination of its operability the author now takes the position that combined x-ray and gastroscopic examination is superior to the exploratory laparotomy and obviates the surgical risk and mortality inseparable from such exploration; that gastroscopy decides the question of the nature of a pyloric obstruction, whether benign or malignant, even better than does examination during the operation and thus predetermines whether a gastro-enterostomy may suffice or whether the more hazardous resection is indicated. Gastrophotography is rightly condemned with faint praise. The x-ray diagnosis of gastritis seems to be extremely untrustworthy, in Schindler's opinion. There, however, appears to be one x-ray picture almost diagnostic of the extremely severe forms of hypertrophic, nodular gastritis, the so-called granulation relief picture.

It is quite obvious that the average clinician and surgeon will not be in entire accord with all the views expressed by the author. Certainly those with a large experience in this field would challenge a number of the conclusions at which he has arrived, at the same time readily conceding his frank sincerity, his masterly skill and his enthusiasm. Nevertheless, this new volume is a classic of its kind and will be one of the greatest incentives to have gastroscopy assume its rightful place in the diagnostic armamentarium of all progressive medical clinics and hospitals in this country.

Le bacille de type bovin dans la tuberculose humaine. Revue de la documentation actuelle. Par le Docteur Marcel Gervois. Paper. Pp. 314. Lille: Imp. L. Danel, 1937.

This book is a thorough presentation of tuberculosis in the human body produced by the bovine type of tubercle bacillus. The author has included a chapter on the avian bacillus and presents a few cases of disease in man produced by the avian type of bacillus, which have been reported from time to time. This number is so small and the data leading to the diagnosis are so incomplete as to lead one to believe that the avian type of tubercle bacillus produces clinical disease in man only with great rarity. The author has assembled the literature from various parts of the world and has compiled numerous tables. For example, from 221 articles over the past thirty-five years he has collected 17,045 bacteriologic examinations to determine the type of tubercle bacilli. He has also assembled information on 260 observations on pulmonary tuberculosis produced by the bovine type of bacillus. A great deal of emphasis is placed on the transmission of the bovine bacillus to man and the pathogenesis of the disease. Such factors as the age of the patient and the incidence of the disease among rural and city dwellers are discussed. The last section of the book is devoted to methods of prevention. Reference is made to 473 articles and it is gratifying to see in this bibliography the names of so many from the United States who have taken an important part in eradicating tuberculosis from cattle.

Visual Perception. By M. D. Vernon, M.A. Cloth. Price, $4.50. Pp. 247, with 19 illustrations. Cambridge: University Press; New York: Macmillan Company, 1937.

Most psychologic textbooks contain a selection from the experimental work on visual perception, but no book covers the entire field in a comprehensive and detailed manner except this one by Miss Vernon. Her aim has been to make the treatment thorough but to avoid any preconceived theoretical bias in the interpretation of the facts.

The material in the book falls under four main headings. First there is an account of the phenomenal development of the perceptual process up to the final stage of meaning and the reaction tendencies. The second section deals with the relation of the perceptual content to certain of the affective states and attitudes. The third section treats of the objective structure of the perceptual field. In the fourth section there is a description of the genetic development in childhood of the perceptual content. Finally she turns to the classification of individual differences.

Miss Vernon admits that her account of the different features of the perceptual process and its relation to meaning and to various secondary sensory and imaginal processes may resemble the old atomistic approach. However, she had been cautious in her acceptance of the reality of these constituents, pointing out that the preconceived ideas and theoretical bias both of experimenter and of subjects may have vitiated the results to an unknown degree.

She shows a preference for the functional approach, as opposed to the "structuralist" position, pointing out how the latter involves a certain rigidity in the analysis and classification of the types of awareness.

In her treatment of the work of the gestalt school of psychology she has avoided any exhaustive criticism of *gestalt theorie* and has limited her account to some of the experimental results which seem empirically valuable.

The final sections of the book delve into the newer and debatable field of individual differences. It is pointed out that the gestalt psychologist has been neglectful in this field, to which his theories only partially apply. On the other hand, Miss Vernon is no champion of the strict typological classification. She believes that any classification of types (whether perceptual, imaginal, synesthetic types or temperament and personality types) should be thought of as a "mere shorthand expression" for types of differences, which will serve our purposes if rightly used.

One of the most interesting and valuable sections in the book is this last part, dealing as it does with types of reactions of individuals to life situations. Miss Vernon has shown an ability to correlate the work of different investigators, noting points of correspondence, ignoring minor differences, so as to introduce a semblance of clarity into a confused and contradictory field. She has criticized the Rorschach classification of personality types as being purely empirical, without rational basis (in a theoretical sense) and as having a low statistical reliability. But she claims that as a quantitative view of the whole personality the scheme has undoubted value. It is more detailed, comprehensive and flexible than other classifications. The introversive and extratensive classification resembles Jung's introvert-extravert typology. Also it bears a similarity to Kretschmer's cycloid-schizoid and Jaensch's integrate-disintegrate. Since it contains as an essential element a classification according to color and form responses, it is in agreement with Oeser's color and form dominant classification. Miss Vernon admits that the apperception type is of most interest to her, since it summarizes and goes beyond the previous work on the subjective-objective, synthetic-analytic and active-passive perceptual types.

The physician and more especially the psychiatrist may find the section on synesthetic types useful as an aid in the interpretation of various abnormal phenomena. The concept of synesthesia is a familiar one, since it is well known that certain people have associations between different types of imagery. That is, the stimulus presented to one sense channel seems to call up imagery in another mode as readily as that of its own. Although temperamental instability and strong emotionality are

not necessarily present, still the phenomena may be associated with adolescence, emotional stress, nervous fatigue, illness, and so on.

In the section on imaginal types, reference to the eidetic image is made, and this type of imagery is clearly differentiated from the primary memory image and the after-image. A conclusion is drawn that the fixed type of eideticism is more common among younger children, when it is a normal phenomenon. But the labile type of eideticism increases in the period of puberty and may be associated with emotional disorders. . .

Miss Vernon states her general conclusion thus: "It is characteristic of these schemata [types of directing tendency, perceptual patterns, and so on] that they provide an immediate and automatic connection between the experiencing individual and the supposed nature of his environment. Thus the observer is normally unaware of the stages in the development of the percept, of the differentiation of form, the assimilation of past experience, the understanding of meaning; he experiences the percept not as a phenomenon arising within his own consciousness but as something really existing in the external environment. . . . Thus the schemata not only provide facilities for the most rapid and efficient development of the percept but also for its reference to and correlation with the essential aspects of the external environment.

"So the naive individual believes that his percepts are completely determined by the external stimulus conditions and are referable in their entirety to some real object or system of objects which exist outside himself. But we have endeavored to show that the phenomenal percept is . . . determined entirely by the established functional schemata—for instance, feelings of familiarity, attitudes, affective tendencies, and so on; and indirectly we become aware of them by studying the nature of the perceptual content. . . . But of their actual structure, the method by which they are established and the manner in which their individual impulsive tendencies are coordinated, we know nothing. . . . We have attempted to dig the ground, to clear away the débris, and perhaps prepare the foundations; as yet we cannot foretell the nature of the edifice to be built thereon."

Tweedy's Practical Obstetrics. Revised and largely rewritten by Bethel Solomons, M.D., F.R.C.P.I., F.C.O.G., Gynaecologist, Dr. Steevens' Hospital, Dublin, and Ninian McIntire Falkiner, M.D., Sc.D., F.R.C.P.I., Visiting Gynaecologist, Royal City of Dublin Hospital. Seventh edition. Cloth. Price, $8.75. Pp. 773, with 295 illustrations. New York & London: Oxford University Press, 1937.

The present edition contains many changes. Some recommendations made in the last edition have been revoked. For example the authors no longer recommend the cervical cesarean section for placenta praevia but now prefer the classic operation. They do not look with as much favor on twilight sleep as they formerly did. Solomons is now definitely opposed to the use of chloroform during labor. He believes that ether is the method of choice in cases of toxemia. Many obstetricians, especially American ones, are of the firm belief that the anesthetic of choice in all cases of toxemia is local anesthesia. The authors continue to advocate gastric lavage and colon flushings, but these measures have almost entirely been given up in this country. Submammary "transfusion" (infusion) is described and illustrated but it is best to avoid injecting large quantities of fluids under the breasts not only because of the immediate pain that results but also because of the discomfort that often arises when the flow of milk is established. The inner surface of the thighs is a better place for injecting fluids subcutaneously. The authors advocate episiotomy only in cases of rigid perineum. The Solomons modification of the De Lee head stethoscope is identical with that proposed by Hillis when the head stethoscope was first devised. Most of the illustrations in the book show women in labor with the pubic and vulvar hairs untouched. In this country almost all women have these hairs shaved off or clipped with scissors during labor. These minor criticisms, however, should not detract from the excellence of the book. It is one of the best textbooks on obstetrics in the English language. The seventh edition will undoubtedly prove to be even more popular and valuable than the previous editions because Solomons has presented in this book the results of his huge experience gathered over a period of many years.

A Textbook of Applied Biochemistry for Pharmacists and Pharmaceutical Students. By Frank Wokes, B.Sc., Ph.C., F.I.C., Member of the Staff of the Pharmacological Laboratories, College of the Pharmaceutical Society of Great Britain. Cloth. Price, $5. Pp. 522, with 79 illustrations. Baltimore: William Wood & Company, 1937.

This volume was written expressly for the pharmacist and pharmaceutical student in England. The recent high standard of educational requirements in pharmacy have created a field for books on biochemistry which meet the specific needs of this field. Accordingly, this book is concerned with the various applications of biochemistry in pharmacy and allied branches of public health. The material is concisely presented. It covers the usual list of subjects given in a syllabus of biochemistry besides more specifically the subjects which should be of special interest to the pharmaceutical student and pharmaceutical chemist. In the opening chapter on the biochemical importance of water the author discusses not only the information of general biochemical interest but also methods of removing water from drugs, variations in moisture content of various drugs, and so on. The succeeding chapters are terse but comprehensive discussions of hydrogen ion concentration, surface phenomena and colloids, spectroscopy and ultraviolet radiation (photochemistry and photosynthesis). In the chapter on bacteria the author discusses sterilization methods and germicides after considering information of general bacteriologic interest. The chapters on hormones and vitamins are well done and contain essential information, in brief, that is of interest to the pharmaceutical student and chemist. At the end of the book is a well selected bibliography.

An Investigation into Questions of Social Hygiene in the Counties of Västerbotten and Norrbotten, Sweden, Conducted with the Support of the Royal Medical Board in 1929-1931. Published in Swedish in 1934. English, partly revised edition. Paper. Various pagination, with illustrations. Lund: Håkan Ohlsson, 1937.

The conditions affecting health in the two farthest north provinces of Sweden were subjected to detailed examination, with special emphasis on diet, housing and school environment. It was discovered that significant vitamin deficiencies could be easily remedied by a somewhat more extensive use and better preparation of certain native berries. The population of the district in 1931 was 407,096. More attention is given to public and private health organizations than to the work of physicians, and it would appear that these various societies and public institutions and nursing services are depended on for a large share of the health care. One general impression seems quite clear, that in spite of the subsidized physicians and salaried medical officers nearly all the problems of rural medical service that trouble the United States are still more or less serious problems in these districts. State grants in aid of district medical services are given only to districts with a population of about 3,000, and the context would indicate that one physician is expected to serve a population of this size.

Allergy: Its Practical Application. By J. A. Rudolph, M.D., Associate Clinician in Charge to the Department of Allergy, Mt. Sinai Hospital, Cleveland, Ohio. Expressly Prepared for Physicians and Students of Medicine, Containing Practical Points Necessary for the Care of Patients with Asthma, Hay Fever, Urticaria, Eczema, and Other Allergic Conditions. Cloth. Price, $3. Pp. 224. Philadelphia: Dorrance & Company, 1937.

This small book is intended to furnish students and practitioners of medicine practical aid in the care of patients suffering from asthma, hay fever and other allergic conditions. In this aim the author has succeeded to a considerable extent. The chapter on house dust and that relating to allergy of the skin are good. The chapter on immunology is brief and there is an almost complete absence of directions regarding dosages used in hyposensitization. The necessity of correlating clinical observations with skin tests is well emphasized. The book unfortunately has some serious defects. The author tends to be dogmatic in several instances; e. g., on page 66 "delayed reactions are of no importance." Other errors appear; e. g., on page 76 Scheppegrell is given credit for first attempting a pollen survey (1917), whereas Blackley's work preceded this some fifty years. On page 81, tree pollen is not mentioned at all as a cause of hay fever in the Central states. On page 136 the use of calcium in asthma is opposed as not all beneficial, yet in 1936 the author wrote an article favoring the use of calcium.

A serious shortcoming is the complete absence of references to recent literature. No article published after 1934 is mentioned and therefore the book is so out of date that it omits entirely such subjects as the valuable oral use of 1:100 solution of epinephrine in asthma.

Mikromethodik: Quantitative Bestimmung der Harn-, Blut- und Organbestandteile in kleinen Mengen für klinische und experimentelle Zwecke. Von Ludwig Pincussen. Sixth edition. Boards. Price, 5 marks. Pp. 193, with 31 illustrations. Leipzig & Vienna: Franz Deuticke, 1937.

This edition attests the popularity of Pincussen's work. It varies from the preceding only in the revision of several methods and the addition of a few of the newer methods. The book begins with a clear, simple statement of the principles involved in measuring and weighing, colorimetric methods, and nephelometry. Then follow sections on the quantitative determination of the common inorganic and organic constitutents of urine, blood, tissue and feces. These are followed by a section on blood examination by gas analysis and a few pages on the determination of hydrogen ion concentration by means of indicators. A subject index follows. The methods are clearly stated under the headings of principle, reagents, procedure, calculation and example. Some of the methods vary from those commonly used in routine clinical analysis. The book is therefore a welcome addition to the library of those who read German, as a supplementary manual on alternate methods for special routine analyses on small quantities of material as well as for research procedures.

The Common Neuroses: Their Treatment by Psychotherapy. An Introduction to Psychological Treatment for Students and Practitioners. By T. A. Ross, M.D., F.R.C.P. Second edition. Cloth. Price, $4. Pp. 236. Baltimore: William Wood & Company, 1937.

To the practitioner of medicine this book is commended. It provides an insight into the etiology and therapy of the psychoneuroses contained in no other book. The author does not limit himself to any single approach in his attempt to understand and treat the psychoneuroses. "Most books now in circulation are pledged to some particular method, and there has been little recognition of the possibility that different methods of treatment may be used to advantage in different types of illness and for different individual patients." His critical analysis of Freud is heartening. He utilizes freudian mechanisms in his therapy and acknowledges Freud's contributions to the bodies of philosophic and psychologic knowledge, but he feels, in common with many others, that Freud's contribution is not basically a therapeutic one. The book should prove of inestimable value to the general practitioner, who sees, and will continue to see, the great bulk of functional and nervous disorders.

Quelques vérités premières (ou soi-disant telles) en pathologie cardio-vasculaire. Par E. Donzelot, professeur agrégé de pathologie médicale à la Faculté de médecine de Paris. Collection publiée sous la direction de MM. L. Ombrédanne et N. Fiessinger. Boards. Price, 24 francs. Pp. 82. Paris: Masson & Cie, 1937.

This little brochure contains a series of short generalizations designed to state definite facts on disorders of the heart and blood vessels. The first portion deals with cardiac arrythmias, angina pectoris, endocarditis, myocarditis, myocardial infarction, congenital cardiopathies and cardiac insufficiency. The second portion is concerned with vascular abnormalities such as arterial and venous abnormalities and hypertension. Myocardial infarction is dealt with as follows: "The clinical syndrome is extremely variable but can be grouped into two types, one in which anginal pain predominates and the other characterized by cardiac insufficiency. . . . The anginal form is characterized by four essential signs: pain, fall of arterial blood pressure, pericardial friction rub and fever. . . . Pain opens the scene brutally, is agonizing and persists for hours or even days: it is also literally insupportable. . . . Fever appears typically on the second day, is constant, and oscillates between 38 and 38.5 degrees C. It is accompanied by leukocytosis." The booklet should be of interest to medical teachers of cardiovascular disease, who may find in the short, pithy statements, which are regarded by the author as "primary truths," texts around which amplifications of the subject may be developed.

Measurements of Ultraviolet Radiation and Illumination in American Cities During the Years 1931 to 1933. By James E. Ives, Senior Physicist, and W. A. Gill, Assistant Chemical Engineer, Office of Industrial Hygiene and Sanitation, U. S. Public Health Service. Prepared by direction of the Surgeon General. U. S. Treasury Department, Public Health Service. Public Health Bulletin No. 233. Paper. Price, 10 cents. Pp. 36, with 11 illustrations. Washington, D. C.: Supt. of Doc., Government Printing Office, 1937.

In the work reported in this bulletin, horizontal surfaces were used for registering measurements. A Macbeth illuminometer provided illumination figures, while ultraviolet measurements were made with a meter developed by Rentschler. The authors believe that the two main contributions of their study are, first, its general nature (measurements were taken in fourteen cities of widespread geographic distribution: New Orleans, Los Angeles, San Francisco, St. Louis, Washington, Baltimore, Philadelphia, Pittsburgh, New York, Cleveland, Chicago, Detroit, Boston and Buffalo) and, second, the determination of the ratio of the antirachitic ultraviolet shorter than 313 millimicrons to the illumination.

Maladies des femmes enceintes. III. Affections de la peau. Par Henri Vignes, professeur agrégé à la Faculté de médecine de Paris. Avec la collaboration de F. Hanoun et G. Vial. Paper. Price, 28 francs. Pp. 202, with 4 illustrations. Paris: Masson & Cie, 1937.

Maladies des femmes enceintes. IV. Affections des muqueuses génitales. Par Henri Vignes, professeur agrégé à la Faculté de médecine de Paris. Paper. Price, 24 francs. Pp. 125. Paris: Masson & Cie, 1937.

These two volumes are the third and fourth in the series of books prepared by Vignes on the illnesses that may occur during pregnancy. In volume III the author takes up diseases of the skin and in its seventeen chapters he discusses the entire field of dermatology that may be associated with gestation. Volume IV deals with the afflictions of the mucous membranes of the vagina and cervix. As was emphasized in the review of the first two volumes (THE JOURNAL, May 2, 1936, p. 1596) the books are encyclopedic in character. The author has thoroughly reviewed the world literature on the subjects he discusses and he summarizes it in excellent fashion. Large sections of each book are devoted to therapy; hence these books should prove to be of great practical value as well as indispensable sources of reference.

Diseases of the Nose and Throat: A Textbook for Students and Practitioners. By Sir St. Clair Thomson, M.D., F.R.C.P., F.R.C.S., Consulting Surgeon for Diseases of the Throat, King's College Hospital, London, and V. E. Negus, M.S., F.R.C.S., Surgeon for Diseases of the Throat and Ear, King's College Hospital, London. Fourth edition. Cloth. Price, $14. Pp. 976, with 415 illustrations. New York & London: D. Appleton-Century Company, Incorporated, 1937.

Thomson's book has always been a popular one, having passed through three editions since its first publication in 1911. The present edition discloses V. E. Negus in the rôle of co-editor and contributor, he having rewritten the subject of peroral endoscopy into a new and separate chapter. Several discarded procedures, such as the Killian operation and intubation of the larynx, have been curtailed in the text to make way for more generally accepted procedures. Experience in the use of the bronchoscope has led to more detailed description of pulmonary and esophageal conditions than is found in the earlier editions. On the whole, the book follows its predecessors rather closely as to the material and its arrangement, offering nothing that is revolutionary but keeping up with recent trends. Like many textbooks that come to us from our English confrères, it is particularly replete with therapeutic minutiae and is therefore the sort of book one likes to refer to frequently when cases fail to respond to a favored routine. To those who are acquainted with the earlier editions there is little more to be said. To those who have not had that pleasure, it may be safely recommended as a valuable addition to a practical library.

Assessment of Risks in Life Assurance Practice. By Jehangir J. Cursetji, M.D., L.R.C.P., L.R.C.S. Paper. Pp. 18. Bombay: The Author, 1937.

This is the kind of pamphlet that many life insurance companies prepare for distribution to newly appointed examiners. The value may be doubted considering such statements as "The mortality from all diseases on the whole is said to be greatest among clerks." "Family history of tuberculosis is the most widespread cause of extra rating."

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Workmen's Compensation Acts: Compensability of Tuberculosis Contracted by Nurse.—The claimant was employed from June 1930 to November 1934 as a nurse by the Muirdale Sanitarium of Milwaukee County, Wis., a sanatorium for tuberculous patients, her work requiring her to come in close personal contact with the patients. In October 1934 she contracted a cold, tuberculosis developed and she applied for compensation under the workmen's compensation act. The examiner for the commission found that the nurse had not contracted tuberculosis in consequence of performing services growing out of and incidental to her employment and dismissed her application for compensation. The industrial commission set aside the examiner's findings and awarded compensation. The county of Milwaukee instituted proceedings to set aside the award of the industrial commission and from an adverse judgment in the trial court the county appealed to the Supreme Court of Wisconsin.

The county contended, among other things, that there was no evidence to sustain the finding of the commission. But, said the court, one physician testified that the nurse probably contracted tuberculosis while working at the sanatorium. The testimony of another medical witness, while not so definite, was open to the inference that the nurse did not have active tuberculosis at the time she entered the employ of the county. A third medical witness testified that a long and continued exposure to tubercle bacilli is a very important factor in reactivating an old lesion. There was, the court said, sufficient competent evidence to sustain a finding either that the nurse did not have tuberculosis or had an arrested case of it at the time of her employment by the county and that the work at the sanatorium either reactivated the disease or constituted its original cause. In either event, the nurse would be entitled to compensation. The award of compensation was affirmed.—*Milwaukee County v. Industrial Commission (Wis.), 272 N. W. 46.*

Optometry Practice Acts: Writ of Prohibition to Restrain Revocation of License for Untrue Statement in Advertising.—The California optometry practice act authorizes the state board of optometry to revoke the license of a licentiate for "the advertising of optical business or treatment or advice in which untruthful, improbable or impossible statements are made." The board initiated proceedings against the plaintiff to revoke his license, alleging that his advertisement in a local newspaper contained untruthful and improbable statements in that he offered for sale complete glasses containing single vision lenses and including frames and examination for $7.50 and that he refused to sell to persons answering the advertisement the advertised glasses for the price stated. Prior to the hearing, the plaintiff instituted proceedings for a writ of prohibition, in the superior court, Los Angeles County, to stay the proceedings. A judgment obtained by the plaintiff was affirmed by the district court of appeal, second district, division 2, California (60 P. (2d) 196), and the case was transferred to the Supreme Court of California for consideration as to the propriety of the issuance of the writ of prohibition.

The office of the writ of prohibition, said the Supreme Court, is limited by the constitution to the restraint of a threatened exercise of the judicial power in excess of jurisdiction. It does not lie to an officer or board exercising purely ministerial functions. The optometry act provides for a state board of examiners in optometry having state-wide jurisdiction over the practice of optometry. Such a board, in the opinion of the court, actually engages in enforcing administrative determinations and does not exercise a judicial function. Agencies engaged in making administrative determinations, unlike courts, have the power and the facilities to investigate and initiate action and, more or less informally, find the facts which under the law justify a course of action. They cannot and do not declare the law but perform the sole duty of ascertainment. Under this theory neither a writ of prohibition nor a writ of certiorari may be utilized to review the determinations of the board. Furthermore, the court was of the opinion that the petitioner was not entitled to any relief on the showing made. He was accused of making untruthful statements in his advertisements. No evidence was taken inasmuch as the present proceeding was instituted before the time set for the hearing. We can appreciate, the court said, that under certain testimony it might be proved that the advertisement was not an untruthful statement, whereas, under other circumstances, it would be demonstrated to be untruthful and intentionally drawn to mislead. Certainly, the court said, untruthful advertising should be held to constitute an untruthful statement. Under such circumstances, the board should be permitted to proceed with the hearing. Accordingly, the judgment for the petitioner was reversed.—*Whitten v. California State Board of Optometry (Calif.), 65 P. (2d) 1296.*

Evidence: Admissibility of Paraffin Mold Used in Gunpowder Test.—The defendant, Westwood, was convicted of murder and appealed to the Supreme Court of Pennsylvania. He contended, among other things, that the trial court erred in admitting in evidence a paraffin mold of his hand and the testimony of expert witnesses that certain black specks on the mold constituted residues of gunpowder.

Shortly after the homicide, an assistant county detective made a "paraffin test" of the right hand of the defendant. Hot paraffin was placed next to the skin. Cotton was placed on that and then another coat of paraffin added. The paraffin was then lifted and later subjected by two chemists to the "diphenylamine test" or "lungee reaction." This was described as "a reaction primarily for nitrates and certain other oxidized substances. . . ." Gunpowder was said to be rich in nitrates. One of the chemists testified that a microscopic examination had revealed the presence of small black specks on the mold and that applying one or more drops of the "lungee reagent" to these specks "an intense blue color with comet tail formations was immediately apparent." This witness further testified that he had applied the reagent to gunpowder and an identical reaction had resulted. Another chemist, in answer to a hypothetical question, testified that the specks on the mold were residues of gunpowder. An expert witness for the defendant, also a chemist, testified that he had found, as a result of experimentation, that the following substances would give a "blue reaction" when the "diphenylamine test" was applied: ordinary soot, sodium perborate tooth powder, Pebeco toothpaste, cigar ashes, cigaret ashes and different kinds of matches. In his opinion, the "paraffin test" to detect the presence of gunpowder was not infallible. The Supreme Court of Pennsylvania, however, held that the mold and the expert testimony with respect to it were admissible in evidence. The judgment of conviction was affirmed.—*Commonwealth v. Westwood (Pa.), 188 A. 304.*

Malpractice: Shortening of Leg After Fracture.—The plaintiff as a result of an automobile accident sustained, among other injuries, a compound comminuted oblique fracture of his right femur about 2½ inches above the knee. He was removed to a hospital and there attended by the defendants. The physicians made a temporary reduction of the fracture and applied immobilizing agents. Five days later an operation was performed and a Lane bone plate, fastened with five one-half inch screws to the bone, was used to keep the fragments in apposition. After the operation the leg was encased in a board splint, and a Buck's extension was applied. An infection subsequently developed. Some of the screws that held the Lane plate gave way, causing the plate to become loose and permitting the fragments of the femur to overlap. As a result, the plaintiff's right leg was about 3 inches shorter than his left. He instituted a suit against the defendants for malpractice, claiming damages in the amount of $40,000. The jury returned a verdict for the physicians but on motion of the plaintiff the trial court set aside this verdict and granted a new trial on the ground that erroneous instructions had been given the jury. The physicians thereupon appealed to the Supreme Court of Missouri, division No. 2.

The instructions that were given the jury, erroneously in the opinion of the trial court, told the jury that nonexpert witnesses could testify concerning external appearances and manifest conditions observable by every one but that in the present case

the question was one of medical and surgical skill to be determined by the opinions of the medical experts and that the jury should not consider the opinions of laymen with respect to the matter. The contention seemed to be that this instruction unduly singled out for comment the opinion testimony of the expert witnesses, thereby usurping the functions of the jury. With this contention the Supreme Court disagreed. The present case, the court said, was tried on the theory that the issue of negligence revolved around the degree of care and skill ordinarily possessed and exercised by physicians and surgeons in good standing in the same or similar communities in the treatment of similar injuries. Whether or not the fracture board that caused pain in the patient's hip should have been removed to relieve the pain within a few days after the performance of the admittedly successful surgical operation, at the possible sacrifice of the successful results theretofore secured and the risk of further complications, was a matter to be determined from the testimony of witnesses possessing the necessary qualifications required through study, training and experience, and not from the testimony of the ordinary layman. So also with respect to the patient's contention that a fall from a bedpan to the mattress ten or twelve days after the operation loosened the Lane bone plate and refractured the femur. While, continued the court, malpractice cases exist wherein expert testimony is not indispensable to the establishment of negligence, the present case was not such a case. Proper instructions, therefore, with respect to the weight to be accorded the testimony of experts were justified.

Juries should not be permitted to say that the method of treating an injury of the nature here involved was negligent despite the fact that the evidence showed that the uniformly adopted practice of the most skilful surgeons had been followed. The mere fact that injury follows negligence, the court pointed out, does not necessarily create liability. The burden rested on the plaintiff to prove by substantial evidence that the physicians in the present case were negligent as charged and to prove the necessary causal connection between such negligence and the injury. If the evidence merely tended to prove that the injury might have resulted from several causes for some but not all of which the physicians were liable, the necessary causal connection remained in the realm of conjecture and speculation. All that the evidence disclosed with reference to the shortening of the patient's leg was that it might have resulted from one or more of several causes. In the opinion of the Supreme Court, the verdict of the jury for the physicians was a correct one and the trial court should have entered judgment on it. The cause was therefore remanded with directions to the trial court to reinstate the verdict of the jury for the physicians and to enter judgment thereon.—*Pedigo v. Roseberry et al. (Mo.), 102 S. W. (2d) 600.*

Privileged Communications: Testimony of Patient Constitutes a Waiver of Privilege.—The defendant insurance company promised to pay certain benefits to the plaintiff in event he became totally and permanently disabled if such disability was not due to a progressive, incurable ailment with which he was afflicted prior to the issuance of the insurance policy. The plaintiff became blind and sued the insurance company on the latter's refusal to pay the promised benefits. From a judgment in favor of the plaintiff, the company appealed to the court of appeals of Ohio, Licking County.

At the trial, the plaintiff claimed that "his eyes went bad" following the "flu" four years after the issuance of the policy. He voluntarily testified as to the nature of his disability. On cross-examination he admitted that he had consulted certain physicians about his eyes and stated that they examined his eyes and fitted him with glasses. The trial court refused, on the theory that a privileged communication was involved, to permit the defendant insurance company to prove by the testimony of these same physicians that the plaintiff's disability was the result of a disease, retinitis pigmentosa, that existed prior to the issuance of the policy. They would have testified that they discovered the disease when they examined the plaintiff's eyes. The insurance company contended that this testimony should have been admitted because the plaintiff had waived the privilege when he voluntarily testified relative to the consultation with these physicians concerning his eyes. In *Ausdenmoore et al., Ex'rs* v. *Holzback,* 89 Ohio St. 381, 106 N. E. 41, said the court of appeals, it was held that a privileged communication may arise not only by word of mouth but by exhibiting the body or any part thereof to a physician for his opinion, examination or diagnosis, and that such privilege can be waived by either the express consent of the patient or his voluntary testimony as to the things and matters communicated to his physician. In the present case, therefore, the information communicated by the plaintiff to the physicians when he exhibited his eyes to them for examination constituted a privileged communication. This communication might have remained privileged, but when the plaintiff voluntarily testified, in his own behalf, "they examined me for the purpose of fitting me with glasses," he waived his privilege. In the opinion of the court of appeals, the trial court erred in rejecting the proffered testimony. The judgment of the trial court was therefore reversed and the case remanded.—*Metropolitan Life Ins. Co. v. McKim (Ohio), 6 N. E. (2d) 9.*

Eugenic Sterilization: Fertility Despite Ligation of Vasa Deferentia.—Bastardy proceedings were instituted against the defendant, charging him with being the father of the relatrix's child. At the first trial a verdict of guilty was set aside by the court and a new trial granted. At the second trial the defendant was convicted of bastardy. The defendant's motion for a new trial on the ground of newly discovered evidence was denied and he appealed to the appellate court of Illinois, third district.

At the second trial the testimony that a physician gave at the first trial was permitted to be read. According to this testimony the physician, years prior to the alleged relationship between the defendant and the relatrix, had "sterilized" the defendant, at which time "both vasa were divided by the ligatures and separated." This witness stated that he had never known this kind of an operation to fail to accomplish its purpose. A medical witness for the relatrix, however, testified that ligation of both vasa deferentia would not necessarily prevent a man from begetting a child; that a simple tying off of a vas deferens would obstruct that duct for the time being but that the duct would reestablish itself after the absorption of the ligature. At the time of his motion for a new trial following his conviction, the defendant presented an affidavit of the physician who had operated on him to the effect that he had not only doubly ligated each vas deferens of the defendant but in addition had removed a section, approximately three-eighths inch in length, from each duct. An affidavit of another physician was also presented in which the affiant declared that the operation as described by the operating physician in his affidavit would, to a reasonable degree of medical certainty, produce sterilization. The defendant claimed that he was entitled to a new trial because of this "newly discovered" evidence.

The appellate court held, however, that the trial court had not erred in refusing to grant the defendant a new trial on the ground of newly discovered evidence because the defendant had not satisfied the court that, as is required by the law of Illinois, the evidence could not have been produced at the trial by the use of reasonable diligence. The court was of the further opinion that the jury was warranted in finding from the evidence presented at the second trial that the defendant was the father of the child. Accordingly, the appellate court affirmed the judgment of conviction.—*People ex rel. Oemke v. Schuring (Ill.), 6 N. E. (2d) 217.*

Society Proceedings

COMING MEETINGS

American Society of Tropical Medicine, New Orleans, Nov. 30-Dec. 3. Dr. N. Paul Hudson, Dept. of Bacteriology, Ohio State Univ., Columbus, Ohio, Secretary.

Society of American Bacteriologists, Washington, D. C., Dec. 28-30. Dr. I. L. Baldwin, College of Agriculture, University of Wisconsin, Madison, Wis., Secretary.

Society of Surgeons of New Jersey, Trenton, November 20. Dr. Walter B. Mount, 21 Plymouth Street, Montclair, Secretary.

Southern Medical Association, New Orleans, Nov. 30-Dec. 3. Mr. C. P. Loranz, Empire Bldg., Birmingham, Ala., Secretary.

Southern Surgical Association, Birmingham, Ala., Dec. 7-9. Dr. Alton Ochsner, 1430 Tulane Ave., New Orleans, Secretary.

Western Surgical Association, Indianapolis, Dec. 3-4. Dr. Albert H. Montgomery, 122 South Michigan Blvd., Chicago, Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to Fellows of the Association and to individual subscribers in continental United States and Canada for a period of three days. Periodicals are available from 1927 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 12 cents if two periodicals are requested). Periodicals published by the American Medical Association are not available for lending but may be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American J. Digest. Dis. & Nutrition, Fort Wayne, Ind.

4: 413-486 (Sept.) 1937

Protamine Insulin Compared to Regular Insulin in Treatment of Diabetes Mellitus. A. Levitt and C. F. Castiglia, Buffalo.—p. 413.

Effect of Nicotine on Intestinal Peristalsis. W. C. Alvarez, Rochester, Minn.—p. 417.

The Management of Strangulated Hemorrhoids. E. L. Cartwright, Fort Wayne, Ind.—p. 425.

Collapsible Indwelling Nasogastric Tube. E. E. Woldman, Cleveland.—p. 428.

Incidence and Permanence of Unexplained Gastric Anacidity in Rhesus Monkey After Histamine and Mecholyl, with Hemotologic Studies. J. G. Schnedorf and A. C. Ivy, Chicago.—p. 429.

Method of Determining and Recording Human Intestinal Motility. R. Kegerreis, Chicago.—p. 432.

*Host Susceptibility to Common Colds. I. G. Spiesman and L. Arnold, Chicago.—p. 438

Functional Disorders of Gastro-Intestinal Tract: The "Gastro-Intestinal Neuroses." W. C. Menninger, Topeka, Kan.—p. 447.

Studies on Autodigestion: VII. Is Digestion of Living Tissues (Claude Bernard's Experiment) a Local Phenomenon? H. Necheles and F. Neuwelt, Chicago.—p. 453.

Host Susceptibility to Common Colds.—Spiesman and Arnold discuss their experimental and clinical observations on common colds. Sixty-three patients observed over a period of three years were selected from the outdoor clinic patients after having had a long history of various types of treatment. The patients finally chosen for this study presented no detectable pathologic conditions as determined by a complete history and by physical and x-ray examination of the sinuses and the chest. The individual suffering from repeated colds between October and April has been found to have an altered vasomotor reaction of the upper respiratory mucosa to thermal stimuli applied to the skin. When the skin is chilled there is a slow, gradual vasoconstriction of the capillaries in the mucosa of the upper part of the respiratory tract which persists for from several minutes to two hours. This represents a maladjustment of the peripheral capillary response to climatic or meteorological environment. So long as this abnormal reaction exists the host is susceptible to the common cold virus and the bacterial flora residing in the upper part of the respiratory tract. The vasomotor response could not be altered nor the incidence of common colds reduced in this group by vaccine therapy. But hydrotherapy and certain simple alterations in the diet accomplished both. The best results were obtained by a combination of the two methods of prevention. The hypersensitive or allergic type of cold is more difficult to control than the chronic, frequent and severe head cold type. The nutritional factor in susceptibility to common colds has been frequently observed during the study. It seems that the mucosa of the nose is more sensitive to allergens ingested by mouth than the skin. The nonallergic diet helped the hypersensitive group to readjust its vasomotor responses. The authors have no explanation to offer for the beneficial results obtained in the frequent infectious head cold group following the elimination of wheat breads, pastries, pies and cookies. Their experience convinces them that these foods increase the susceptibility of the sufferer from a chronic cold to repeated attacks and exercises a detrimental influence on the nasal vasomotor response to thermal cutaneous stimuli. The reservoir for the causative agent of common colds is, in the main, confined to the chronic, frequent and repeated head cold subjects. The restriction of the distribution of this virus can best be approached by increasing the resistance of these people to auto-infection. This group responds to preventive and hygienic procedures better than the hypersensitive group. The hypersensitive type of disturbance of the upper part of the respiratory tract is not communicable and from the standpoint of public health is not a source of contagious material. The person with the repeated or chronic type of common cold is out of adjustment to his environmental factors and hence requires some corrective measures to assist in adaptation, such as vasomotor stimulation (hydrotherapy), certain dietary restrictions or better mental hygienic control. While in a state of maladjustment, this portion of the population acts as reservoirs for the virus of the common cold. The extent or magnitude of the maladjustment of sufferers of the chronic or frequent cold differs in individuals. Some will find that retaining the vasomotor reflex response by hydrotherapy will be sufficient to prevent colds. Some will find the nutritional factor most important. Others will find the mental factor to be of major importance.

American Journal of Ophthalmology, St. Louis

20: 881-984 (Sept.) 1937

Experimental Study of Choked Disk in the Rat. W. A. Jeffers, J. Q. Griffith Jr., W. E. Fry and A. G. Fewell, Philadelphia.—p. 881.

Aniseikonia in Emmetropia. W. L. Hughes, Hempstead, Long Island, N. Y.—p. 887.

Studies on Infectivity of Trachoma: VII. Further Observations on Filtrability of the Infectious Agent. L. A. Julianelle, M. C. Morris and R. W. Harrison, St. Louis.—p. 890.

Use of Mucous Membrane in Ophthalmic Surgery. E. B. Spaeth, Philadelphia.—p. 897.

*Hypertensive Meningeal Hydrops: Syndrome Frequently Following Infection in Middle Ear or Elsewhere in the Body. L. M. Davidoff and C. G. Dyke, New York.—p. 908.

Unusual Recovery from Endophthalmitis of Meningococcus Meningitis: Report of Case. N. K. Lazar, Chicago.—p. 928.

Visual Acuity Survey: Report of 721 Cases. C. W. Rainey, Chicago.—p. 930.

Plastic Repair of Lid Hernia with Fascia Lata. B. R. Sakler, Cincinnati.—p. 936.

Some Results of Intranasal Dacryocystorhinostomy. T. E. Walsh and L. Bothman, Chicago.—p. 939.

Hypertensive Meningeal Hydrops.—From 1929 to 1935, at the Neurological Institute, Davidoff and Dyke isolated fifteen cases that presented a uniform clinical and encephalographic syndrome, consisting of signs of increased intracranial pressure; that is, increased spinal fluid pressure, headache and papilledema, but seldom vomiting. The oldest patient was 43 and the youngest 4½ years of age; eleven were females. Four patients gave a history of otitis media, one had a long history of chronic illness in which a focus of infection was sought and several organs had been removed, one gave a history of pneumonia complicated by thrombosis of the femoral vein followed by ulceration of the leg, one had attacks of cholecystitis, one patient had a four plus and another a one to two plus Wassermann reaction of the blood but their spinal fluid Wassermann tests were negative, and six patients gave no history or evidence of infection that could be considered related to the present illness. In practically all the cases the principal symptoms were headache in eleven cases, failing vision in ten, vomiting in five, tinnitus in four and dizziness in two. Diplopia was present in three cases. The duration of the symptoms varied from two years to twelve days. The chief sign in all these cases was papilledema, often of a high degree; that is, from 3 to 6 diopters. The spinal fluid showed a normal cell count in all but one case, in which 66 cells were present. The total protein was normal with the exception of one, in which 75 mg. per hundred cubic centimeters was present. The gold curve was negative in all cases. Tests for globulin were negative except for one plus in the case presenting the high cell count. Plain films of the skull showed evidence of increased intracranial pressure in ten cases. In twelve of the fourteen cases in which air studies were made the air was injected directly into the ventricles because of the papilledema. A high percentage failed to show satisfactory filling on direct ventriculography, which can be explained by the small size of the ventricles and the high intracranial pressure. This combination the authors believe resulted in expulsion of the gas along the tract of the needle when ventriculography was used. Evidence of this mechanism was found. Thirteen of the fifteen patients were treated by subtemporal decompression. One, a child, showed some ataxia on clinical examination and underwent a suboccipital exploration and decompression; one had no operation whatever. In addition, the patients were treated by dehydrating measures, consisting

of limitation of fluid intake, saline cathartics or retention enemas, and intravenous hypertonic dextrose solution when indicated. All the patients improved during their stay in the hospital. After they left the hospital the dehydrating measures were continued at home, and improvement continued; but final disappearance of the papilledema required from six months to several years, with occasional recurrence of headache.

American Journal of Physiology, Baltimore

120: 1-212 (Sept.) 1937. Partial Index

Physiologic Reactions of Human Body to Varying Environmental Temperatures. C.-E. A. Winslow, L. P. Herrington and A. P. Gagge, New Haven, Conn.—p. 1.
Response of Liver to Oral Administration of Glucose. I. S. Cherry and L. A. Crandall Jr., Chicago.—p. 52.
Serum Potassium and Sodium as Altered by Adrenalectomy and Nephrectomy. E. M. MacKay, H. C. Bergman and Lois Lockard MacKay, San Diego, Calif.—p. 83.
Effect of Physiologic Hypersecretion on Gastroduodenal Mucosa: Experimental Study in Dog. C. R. Schmidt and S. J. Fogelson, Chicago.—p. 87.
Blood Pressure Responses to Acute Carbon Monoxide Poisoning. N. R. Brewer, Chicago.—p. 91.
Quantitative Method for Bio-Assay of Progestin. G. Pincus and N. T. Werthessen, Cambridge, Mass.—p. 100.
Interaction of Rate and Depth Components of Respiratory Control. R. Gesell, E. H. Steffensen and J. M. Brookhart, Ann Arbor, Mich.—p. 105.
Pupillary Inequality in Cat Following Experimental Lesions of Occipital Cortex. W. H. Waller and R. W. Barris, Washington, D. C.—p. 144.
Decreased Red Cell Fragility After Splenectomy. A. S. Gordon, W. Kleinberg and E. Ponder, Cold Spring Harbor, N. Y.—p. 150.
Some Observations on Organization of Retinal Response. S. H. Bartley, St. Louis.—p. 184.
Oxygen Deficiency, Carbon Dioxide and Temperature Regulation. E. Gellhorn, Chicago.—p. 190.
Urinary Excretion of Sucrose and Its Distribution in Blood After Intravenous Injection into Normal Men. N. M. Keith and Marschelle H. Power, Rochester, Minn.—p. 203.

Am. J. Syphilis, Gonorrhea and Ven. Dis., St. Louis

21: 475-592 (Sept.) 1937

*Present Needs in the Public Health Control of Gonorrhea. T. Parran, Washington, D. C.—p. 475.
Clinical Excretion of Bismuth: II. Urinary Excretion of Bismuth After Clinical Intramuscular Injections of Sodium Iodobismuthite (Sodium Bismuth Iodide (Iodobismitol) and Sodium Bismuth Thioglycollate (Thiobismol). T. Sollmann, H. N. Cole and Katharine Henderson, with collaboration of G. W. Binkley, W. H. Connor and M. Sullivan, Cleveland.—p. 480.
Id.: III. Fecal and Total Excretion. T. Sollmann, H. N. Cole and Katharine Henderson, with collaboration of G. W. Binkley, W. H. Connor and M. Sullivan, Cleveland.—p. 492.
Id.: IV. Late Excretion of Bismuth After Cessation of Treatment. T. Sollmann, H. N. Cole and Katharine Henderson, with collaboration of G. W. Binkley, W. H. Connor and M. Sullivan, Cleveland.—p. 506.
Clinical Evaluation of Oral Bismuth (Bismutrate) Therapy in Early Infectious Syphilis in the Female. Carmen C. Thomas, Philadelphia.—p. 513.
Failure of Sulfanilamide to Affect Syphilis in Rabbit: Note. A. D. Campbell, Baltimore.—p. 524.
*Experimental Treatment of Early Syphilis with Artificial Fever Combined with Chemotherapy. W. M. Simpson and H. W. Kendell, Dayton, Ohio.—p. 526.
Granuloma Inguinale: Preliminary Report on Certain Microscopic Observations. D. C. A. Butts, Philadelphia.—p. 544.

Present Needs in the Public Health Control of Gonorrhea.—Parran maintains that the ultimate attainment of success in the control of gonorrhea lies in the vigorous prosecution of research work, particularly laboratory experiments which may be correlated with clinical research. He recommends that the furtherance of research work in gonorrhea is the immediate objective. The United States Public Health Service will cooperate in this. Before any new method is accepted in the future, it should be studied critically in order to determine whether it is one of real merit.

Treatment of Early Syphilis with Artificial Fever and Chemotherapy.—With the hope that time and expense might be lessened and that the disastrous late complications of syphilis might be prevented, Simpson and Kendell subjected thirty-four patients with primary and secondary syphilis to combined fever and chemotherapy. The usual course of fever therapy in all but six of these patients consisted of approximately fifty hours of sustained rectal temperature between 105 and 106 F., the average being 105.8 F. The artificial fever therapy was administered at approximately weekly intervals for a period of ten weeks. With the exception of two patients who exhibited idiosyncrasy to chemicals, the usual course of chemotherapy consisted of thirty injections of bismuth arsphenamine sulfonate each containing 0.2 Gm.; or thirty injections of neoarsphenamine, each containing 0.3 Gm., and thirty injections of a bismuth compound, each containing 0.2 Gm. of metallic bismuth. No essential difference was observed in the response of the patients treated with bismuth arsphenamine sulfonate or neoarsphenamine and bismuth. The first ten intravenous injections were administered one-half hour before the fever treatment was begun. The injections of bismuth were given intramuscularly just before each fever session was started. Injections of chemotherapeutic agents were then given at weekly intervals for a period of twenty weeks at the conclusion of the course of combined fever-chemotherapy. The injections of neoarsphenamine and bismuth were given concurrently. Ordinarily, the standard diagnostic tests remained strongly positive during the first four to six weeks of combined treatment. During the same interval the Kahn quantitative units would ordinarily exhibit a rise after the first treatment and a progressive decline during the next four to six weeks. The combined therapy appears to intensify the curative action of the chemotherapeutic agents. Fever therapy alone or chemotherapy alone, as applied to control groups of patients, was inadequate in a high proportion of cases. In certain instances in which syphilitic lesions progressed in spite of chemotherapy, these lesions began to heal promptly after fever therapy was instituted. The response of certain patients who received a relatively short course of fever therapy, combined with chemotherapy, suggests that an equally favorable outcome might result from a shorter course of fever therapy in those patients who exhibit a prompt and uniform decline in the serologic reactions as measured by truly quantitative tests. Conversely, it is quite apparent that certain patients will require larger amounts of fever therapy or chemotherapy, or both.

Annals of Otol., Rhinol. and Laryngology, St. Louis

46: 577-864 (Sept.) 1937

Anomalies of Cochlea in Patients with Normal Hearing. L. M. Polvogt and S. J. Crowe, Baltimore.—p. 579.
Observations on Sinus Abnormalities in Congenital Total and Hemiabsence of the Nose. V. P. Blair, J. B. Brown and L. T. Byars, St. Louis.—p. 592.
Nasal Blood Vessels Which Serve as Arteries in Some Mammals and as Veins in Some Others. P. F. Swindle, Milwaukee.—p. 600.
Study of Nutrition in Relation to Infections of Upper Respiratory Mucous Membranes. R. A. Hetler, St. Louis.—p. 629.
Clinical Relationship of Infections in Upper Respiratory Tract to Certain Types of Chronic Posterior Uveitis: Part II (Supplemental Report). W. D. Gill, San Antonio, Texas.—p. 643.
*Nontumorous Cysts of Maxilla: Interesting Cases and Discussion. R. S. Rosedale and S. W. Koepf, Buffalo.—p. 652.
Cerebellar Herniation as Cause of Death. C. S. Nash, Rochester, N. Y.—p. 673.
*Picric Acid-Calcium Carbonate Treatment (Stewart) of Osteomyelitis Applied to Ear and Nose Conditions. H. J. Gray, Newington, Conn.—p. 681.
Comparative Study of Sphenoid Sinus: Study of 1,600 Skulls. F. W. Dixon, Cleveland.—p. 687.
Evaluation of Displacement Method: Review of Literature. A. W. Proetz, St. Louis.—p. 699.

Nontumorous Cysts of Maxilla.—Rosedale and Koepf report seven cases of maxillary cysts of dental origin. Six of these encroached on the antrum. One was complicated by an osteoma, and in one case impacted teeth were present within the cyst. Supernumerary teeth were present in two others. In two cases the cyst became manifest after extraction of teeth, and two were associated with carious teeth. The other three were of follicular origin. Cysts of dental origin, other than those resulting from adamantinomas, are usually designated as follicular or radicular cysts. The former are those which are associated with the second dentition. Their presence often can be suspected from defects in the dental arch due to unerupted or supernumerary teeth. They are symptomless, unless of large size or infected, and are most often discovered by x-ray examination. Radicular cysts are always found in connection with infection at the root of a devitalized tooth. They do not contain teeth. Both types of cyst may be infected or noninfected and the contents may vary from fluid to semisolid amorphous material. Enlargement in either type may cause secondary devitalization of neighboring teeth. Periapical

infection is considered the exciting influence in the development of radicular cysts. The usually accepted theory of the development of a follicular cyst is that it results from the hollowing out of the follicle of an unerupted tooth. There are many theories regarding the histogenesis of cysts of dental origin, each of which has ardent testimony in behalf of its validity. However, when critically scrutinized, none of them seem to conform to usually accepted pathologic concepts. The treatment of these cysts should consist of removing the cyst by blunt dissection through an intra-oral incision made over the point of greatest swelling. The remaining cavity is then connected to the nose through a large window under the inferior turbinate. The first incision is sutured. The cavity is irrigated through the antronasal window. This type of treatment tends to result in less deformity and discomfort and more rapid healing than packing and irrigation through the intra-oral incision.

Trinitrophenol-Calcium Carbonate Treatment in Sinus Infections.—Gray believes that chronic infections of the accessory sinuses, wherein there is often an associated osteomyelitis (caries or necrosis) in varying degrees, may be considered analogous to chronic osteomyelitis. Irrigations of various solutions, for their antiseptic and healing effects, have been unsuccessful in the treatment of chronic infected sinuses, particularly the maxillary sinuses. The maggot treatment cannot be used, and the extract, if known to the patient, would be objected to if not considered undesirable by the physician. The Stewart treatment (trinitrophenol-calcium carbonate) offers a desirable method of treatment when preliminary operative work, débridement and proper drainage, has been done. Since there is a precipitate formed between the trinitrophenol-calcium carbonate of a fine nature, a sufficiently large opening must be made to allow use of the Stewart method of treatment in selected cases of chronic conditions of the ear and nose (accessory sinuses). The trinitrophenol solution is easily sprayed into the opened sinuses by use of an atomizer equipped with the long, slender, detachable spray tip (which may be sterilized). The tip can be easily curved to insert through the opening, especially through a naso-antral opening, into the maxillary sinus. The calcium carbonate suspension is applied in the same manner. The surroundings must be kept as aseptic as possible during treatment. Contrary to other methods, the trinitrophenol-calcium carbonate alleviates existing pain. It is well tolerated by the patient from a psychic as well as physical standpoint. Four case histories are submitted that demonstrate the value of the foregoing method. Granulation tissue formed promptly, purulent discharge was rapidly reduced, healing was rapid, pain and discomfort were minimized, and the residual scar was less marked than that with any other method of treatment, excepting the maggot treatment. It also produced rapid healing in chronic wounds of the flesh in addition to chronic bone conditions.

Archives of Otolaryngology, Chicago

26: 259-386 (Sept.) 1937

Critique of Present Treatment of Deafness Due to Lesions in Conduction Mechanism. I. Friesner and J. G. Druss, New York.—p. 259.
Ethmosphenofrontal Operation. W. L. Simpson, Memphis, Tenn.—p. 270.
*Analysis of Results of Vaccination of College Students Against Colds. K. M. Houser, Philadelphia.—p. 283.
Tracheopathia Osteoplastica (Osteoma of the Trachea). H. J. Moersch, A. C. Broders and F. Z. Havens, Rochester, Minn.—p. 291.
Surgical Treatment for Suppurative Petrositis: A Critique. S. J. Kopetzky, New York.—p. 294.
Deafness Associated with Meningococcemia. H. Leichenger and S. M. Abelson, Chicago.—p. 306.
Otitic Meningitis: Report of Case in Which Treatment Was Followed by Recovery. D. Woodman, New York.—p. 310.
Logical Surgical Approach to Tip Cells of Petrous Pyramid. R. M. Dearmin, Indianapolis.—p. 314.
Glossopharyngeal Neuralgia Associated with Abscess of Petrous Tip Following Mastoiditis. H. P. Schugt, New York.—p. 321.
Irradiation for Infection in Otolaryngology. T. C. Galloway, Evanston, Ill.—p. 327.
The Paranasal Sinuses. S. Salinger, Chicago.—p. 337.

Results of Vaccination Against Colds.—The student health department of the University of Pennsylvania decided to give prophylactic vaccination against colds to those students who wished to give this treatment a trial. Houser reports that in the last four years 108 students have been so treated. A series of nine injections of the following doses was given to each subject: 0.1 cc., 0.2 cc., 0.3 cc., 0.4 cc., 0.5 cc., 0.6 cc., 0.7 cc., 0.8 cc. and 1 cc. of a stock vaccine. The smaller doses were given every three to five days, whereas the doses above 0.5 cc. were given at weekly intervals. In no case did any constitutional reaction occur. Many complained of slight soreness of the arm, which usually disappeared in from twenty-four to forty-eight hours. A few experienced transient symptoms of an acute cold within the forty-eight hours following injection. In 1936 and 1937, questionnaires were sent to members of the group who were inoculated. Although ninety-four replies were secured to the questionnaires, only eighty-six could be included in the final report because only three months had elapsed since the completion of the series of inoculations for the eight persons whose answers were discarded. On tabulation of the results, it was found that in this group the total number of colds was 479 in the years prior to treatment and 181 in the year subsequent to treatment. The total number of days for the group during which they suffered from colds dropped from 5,160 a year before treatment to 1,666 in the year after vaccination. Of the eighty-six subjects, sixty-eight reported improvement subsequent to treatment. Of this group, fifteen had no colds during the winter following the series of injections. Eighteen were improved in no way by the injection. Of the eighty-six students, only twenty-eight were completely free from any local condition that might be considered a predisposing factor, such as the granular posterior pharyngeal wall studded with lymphoid islands, slight nonsuppurative sinusitis or a borderline nasal deformity. Of this group, twenty-five were improved. The greatest improvement occurred in reducing the severity and duration of colds rather than in eliminating them. This would be in keeping with the virus causation, for, if this is the method of production of most colds, one certainly could not expect to prevent their occurrence by the administration of a bacterial vaccine, but the chances of influencing the secondary stage, in which bacteria play a prominent part, might be considerable. Until something better is available it seems worth while to continue this form of therapy. There is little evidence that colds are prevented by this type of therapy.

Archives of Pathology, Chicago

24: 281-410 (Sept.) 1937

Attempts at Cultivation of Viruses Producing Leukosis in Fowls. J. Furth and C. Breedis, New York.—p. 281.
*Chylous Effusions Produced by Experimental Ligation of Superior Vena Cava: Chemical and Cytologic Studies. C. S. Robinson, R. S. Cunningham, A. Blalock, Mary E. Gray and B. C. Rogers, Nashville, Tenn.—p. 303.
Anatomic Changes Produced by Thyroid Feeding and by Injection of 3,5-Diiodotyrosine. C. L. Connor, San Francisco.—p. 315.
Wave Mechanics of Protoplasmic Action: XI. Experimental Histology of Nerve Fibers. E. J. Carey, Milwaukee.—p. 325.
Auricular Thrombosis in Rheumatic Heart Disease. I. Graef, A. R. Berger, J. J. Bunim and C. E. de la Chapelle, New York.—p. 344.

Chylous Effusions and Ligation of Superior Vena Cava.—Robinson and his co-workers found references to 100 cases in which the diagnosis of chylothorax seems to have been correct. In eighty-three of these cases the data on the cellular content of the fluid and on the changes in the cell picture in the blood stream have been meager. Although somewhat more complete, the chemical studies on these fluids have also been inadequate. Therefore thirteen differential blood counts were made in ten of the reported cases of chylothorax. The total white blood cell counts varied from 4,000 to 25,000. In six instances there was a high proportion of lymphocytes, while in seven the lymphocytes varied from 6 to 16 per cent. The authors had previously produced experimental chylothorax in twenty-one of thirty-six animals (dogs and cats), in each of which the superior vena cava was ligated. The present report is a continuation of that study, with particular emphasis on the chemical and cellular composition of the fluids. The cellular changes occurring in the blood stream as a result of the ligation of the superior vena cava are compared with the cellular picture of the chylous fluids. Eleven additional animals have been studied since that time. In twenty-eight animals of this group typical chylous effusions developed; in eleven fluid was obtained from the pleural cavities, which was, however, not chylous, and in eight animals there was no fluid. In all the experiments in which the superior vena cava was ligated it is assumed that the development of chylous effusions was dependent on the obstruction thus produced to the delivery of lymph from the abdominal viscera through the thoracic duct and its collateral

and anastomotic channels. Ligation of the superior vena cava has been found to produce milky fluids which are extremely rich in lymphocytes but which also contain neutrophils. In the circulating blood of animals the total number of lymphocytes and the total number of eosinophils drop markedly following ligation of the superior vena cava. The obstruction of lymphatic drainage is assumed to be of sufficient importance to account for the decrease in lymphocytes. Milky fluids produced by ligation of the superior vena cava in dogs are true chylous effusions the opacity of which is due to free fat. The lipids estimated as "neutral fat" comprise about 80 per cent of the total lipids. The quantities of free cholesterol are small but show a tendency to form a constant fraction of the total lipid. The esterified cholesterol, on the other hand, is less inclined to vary with the neutral fat. The total nitrogen values probably include nitrogen from nonlipid compounds. The aminonitrogen is mostly due to true lipids, and it tends to vary with the neutral fat. The phosphatide fraction contains substances that are neither lecithin nor cephalin. These, too, tend to vary with the neutral fats. The correlation between the phosphorus and aminonitrogen seems to indicate that they, to a large extent, rise and fall together.

Canadian Medical Association Journal, Montreal

37: 209-310 (Sept.) 1937

Differential Diagnosis of Pain in the Chest. J. A. Oille, Toronto.—p. 209.
*Myasthenia Gravis: Clinical Review of Eighty-Seven Cases Observed Between 1915 and the Early Part of 1932. F. S. Kennedy, London, Ont., and F. P. Moersch, Rochester, Minn.—p. 216.
Glandular Therapy in Gynecologic Conditions: Preliminary Report. Marion Hilliard, Toronto.—p. 223.
Lipid Content of Leukocytes from Heparinized Blood. E. M. Boyd and R. B. Murray, Kingston, Ont.—p. 229.
*Gynecologic and Endocrinologic Aspects of Sterility. H. A. Baron, Montreal.—p. 232.
Contact Eczema from Dyed Clothing. J. F. Burgess, Montreal.—p. 237.
Transient Recurrent Bundle-Branch Block. S. Eidlow, Montreal.—p. 240.
Rupture of Membranes in Relation to Labor. J. C. Goodwin, Toronto.—p. 243.
Comparative Study of Three Surgical Masks. P. P. Gauthier, Montreal.—p. 250.
Lighting as a More Exact Science. S. Ramsey, Montreal.—p. 253.
Two Common Complications of Ear Infections. P. E. Ireland, Toronto.—p. 256.
Irradiation Therapy of Cancer of the Breast. C. M. Henry, Regina, Sask.—p. 261.
Further Report on Ascorbic Acid Treatment of Whooping Cough. M. J. Ormerod, B. M. Unkauf and F. D. White, Winnipeg, Manit.—p. 268.

Myasthenia Gravis.—In fifty-one of the eighty-seven cases of myasthenia gravis under review, Kennedy and Moersch could not discover any cause that might be considered as a possible factor in the causation of the disease. In twenty-seven it appeared that some infection, such as a "cold," "flu," tonsillitis and pneumonia played a precipitating part, although the relationship of apparent cause and effect was not always clear. Recurring episodes of myasthenia gravis were frequently preceded by some acute infectious process. The ages of the patients at the time of the first onset of the symptoms varied from 10 to 77 years. The greatest number were in the third and fourth decades of life. There were forty-five male and forty-two female patients. The factor of race had no apparent significance. In no instance was there any evidence of either familial or hereditary factors. There was no close correlation between the occupation of the patient and the situation of the early muscular weakness. There was no special environmental or geographic characteristic. The length of time that elapsed between the onset of the first symptoms and the making of the correct diagnosis ranged from one month to twenty-five years and varied considerably. For the eighty-seven cases this period averaged 4.8 years. The appearance of the first symptom of myasthenia gravis and the appearance of the first objective sign of the disease paralleled each other rather closely. The ocular muscles were involved in 78 per cent of the cases, facial muscles and masseter muscles in 61 per cent, muscles of deglutition and phonation in 58 per cent, muscles of the arms in 29 per cent, muscles of the legs in 24 per cent and muscles of the neck and shoulders in 17 per cent. No unusual reflex disturbances were observed in any of the cases. The deep tendon reflexes were occasionally decreased or even increased but never absent. The spinal fluid was entirely normal in the twenty-eight of the thirty-two cases in which it was examined. Not infrequently myasthenia gravis may present itself under the guise of marked general fatigue, but not every state of chronic fatigue is a form of myasthenia gravis. Twenty-seven patients had a complete remission which lasted on the average 2.2 years. Any accompanying illness exaggerates the existing symptoms and also tends to precipitate added myasthenic symptoms. There were thirty-four deaths. As neither any therapeutic measure of value nor any practical or consistent regimen for treating patients was available at the time, this mortality represents essentially that of the untreated disease.

Gynecologic and Endocrinologic Aspects of Sterility.—Baron declares that in 70 per cent of the cases of sterility there is no single absolute cause and therefore the sterility is only relative. A relative sterility in one partner may be overcome by a high fertility in the other. Local genital abnormalities, the influence of constitutional depressions, the multiple incidence of etiologic factors and the division of responsibility between male and female are the causes given by Meaker. Many cases of sterility cannot be explained by present knowledge. Doubtless the newer advances in endocrinology and reproductive physiology will help to solve some of its problems. That a specific immunity exists in some cases is not beyond the realm of probability, since by changing partners conception often occurs after so-called previous sterile matings. Endocrinology, although promising as it may seem, can at best be only a partial factor as far as sterility is concerned. Only from 10 to 15 per cent, at most, of cases will be aided by endocrine preparations. The tide of enthusiasm which hailed the discovery of the sex hormones is receding. In the final analysis the major causes of sterility are still obstructive—whether congenital or acquired, through new growth or inflammation anywhere in the genital tract, from hymen to tubal fimbriae. Tubal closures are frequently the result of abortions which become mildly infected. They will remain only so long as knowledge of the control of conception is limited to the favored few. When birth control makes abortions unnecessary an important forward step will be made in preventive medicine and, paradoxical as it may seem, will have lowered the incidence of sterility. The major problem of sterility is a gynecologic and urologic one, and only by the continued cooperation of these two specialties will the greatest good be achieved.

Florida Medical Association Journal, Jacksonville

24: 133-190 (Sept.) 1937

Heart Block. T. Z. Cason, Jacksonville.—p. 149.
*Tetanus. J. S. Stewart, Miami.—p. 153.
Medical Aspect of Postoperative Crises. M. J. Flipse, Miami.—p. 156.
Worship of the Sun. L. S. Oppenheimer, Tampa.—p. 159.
Diagnosis and Treatment of Diseases of Tracheobronchial Tree. J. Buff, Orlando.—p. 163.
Treatment of Burns. G. H. McSwain, Arcadia.—p. 165.
Atypical Symptoms of Malaria. L. L. Whiddon, Fort Pierce.—p. 167.

Tetanus.—Stewart declares that prophylaxis must not stop with tetanus antitoxin. The wound must be made unfavorable for the germ. Closed wounds must be eliminated and foreign bodies removed. Secondary infection must be controlled. It is only by débridement that foreign material and contused tissues can be seen and removed and punctured wounds made into open wounds. The mere injection of 1,500 units of tetanus antitoxin is no longer considered adequate treatment of contused or punctured wounds. Puncture wounds, such as nail wounds to the sole of the foot, should be excised and splinter wounds should be opened to their depth. The importance of readministration of prophylactic serum in deep and severely lacerated wounds and compound fractures is often overlooked. It is well to remember the ability of the spores of the tetanus bacillus to lie dormant and, since the serum remains in the body for only fourteen days, a second or even a third injection is frequently indicated. Clinical and experimental experiences have proved that antitoxin has no effect on toxin already fixed and causing symptoms. The intravenous administration (from 20,000 to 60,000 units in 300 cc. of physiologic solution of sodium chloride) of serum is advised under general anesthesia or tribromethanol in amylene hydrate at the first suggestive symptom. Muscular spasm and reflex convulsions should be controlled as much as possible by sedatives. Adequate fluid and nourishment should be given by the nasal catheter and specialized nursing care in quiet isolation should be demanded.

Journal of Allergy, St. Louis

8: 523-644 (Sept.) 1937

Method of Measuring Rate and Degree of Absorption of Antigens, as Applied to Effects of Certain Drugs, Menstruums and Modes of Administration. S. M. Feinberg and T. B. Bernstein, Chicago.—p. 523.

Crossed Reactions to Household Dusts. H. C. Wagner and F. M. Rackemann, Boston.—p. 537.

Lack of Correlation Between Hypersensitivity to Egg White and Symptoms of Injury. Lois Almon and Helen T. Parsons, Madison, Wis.—p. 547

Prophylactic Treatment for Ragweed Hay Fever: Statistical Study. J. A. Clarke Jr. and H. C. Leopold, Philadelphia.—p. 560.

*Deficiency of Atmospheric Humidity as Contributing Factor in Prolonged Asthma. S. J. Parlato, Buffalo.—p. 566.

Possibility of an Allergic Factor in Essential Hypertension. W. T. Vaughan and C. J. Sullivan, Richmond, Va.—p. 573.

Bone Scorings in Normal and Allergic Children. R. Chobot and E. F. Merrill, New York.—p. 588.

Calculating Pollen Concentration of Air. E. C. Cocke, University, Va.—p. 601.

Deficiency of Atmospheric Moisture as Factor in Prolonged Asthma.—Parlato hopes to show that it is really the control of humidity which plays an important part in relieving asthmatic patients. He investigated the effects of the lack of sufficient moisture in the air and of raising the temperature during the colder months of the year; he concludes that a lack of sufficient moisture in the air or relative humidity in well heated homes and other indoor places during the colder months is an important factor in the causation of prolonged asthmatic attacks. The use of belladonna, stramonium and allied drugs often is contraindicated. The latter are to be used only with great caution. Their paralyzing action on the mucous glands of the respiratory tract aggravates and delays recovery from an asthmatic attack. Treatment calls for the immediate withdrawal of any of the foregoing drugs. Methods of supplying an adequate amount of moisture are described. With a normal relative humidity, patients responded more readily to the usual therapeutic measures which are used for the relief of asthma. Subsidence of prolonged asthma is more prompt and effective. A wider distribution of accurate air conditioners in homes, industry and business will provide a necessary and important means of maintaining a correct temperature and relative humidity, thus helping to reduce the number and duration of prolonged asthmatic attacks.

Journal of Lab. and Clinical Medicine, St. Louis

22: 1209-1326 (Sept.) 1937. Partial Index

Guanidine-like Substances in the Blood: II. Blood Guanidine in Nitrogen Retention and Hypertension. J. E. Andes, Morgantown, W. Va.; C. R. Linegar, Washington, D. C., and V. C. Myers, Cleveland.—p. 1209.

*Comparative Study of Oral and Subcutaneous Vaccination Against Typhoid Fever Based on Agglutination Titrations. H. D. Moor and Ida Lucille Brown, Oklahoma City.—p. 1216.

Ascorbic Acid Content of Red Cells and Plasma. M. Pijoan and E. Eddy, Boston.—p. 1227.

Lobar Pneumonia and Organic Heart Disease. M. M. Weiss, Louisville, Ky.—p. 1230.

Partition of Urea in Blood. E. M. Boyd and R. B. Murray, Kingston, Ont.—p. 1232.

Digitalis Diuresis and Certain Blood Serum Characteristics. J. H. Defandorf, Washington, D. C.—p. 1237.

Amount of Complement in Blood in Rheumatic Fever and Rheumatoid Arthritis. M. Rachmilewitz and W. Silberstein, Jerusalem, Palestine.—p. 1240.

*Does Aspiration Biopsy of Tumors Cause Distant Metastasis? J. McLean and K. Sugiura, New York.—p. 1254.

Effect of Intermittent Venous Occlusion on Circulation of Extremities: Studies of Skin Temperature. E. V. Allen and R. E. McKechnie, Rochester, Minn.—p. 1260.

Quantitative Determination of Convulsive Reactivity by Electric Stimulation of the Brain with Skull Intact. E. A. Spiegel, Philadelphia.—p. 1274.

New Method of Recording Physiologic Activities: I. Recording Respiration in Small Animals. C. Fenning, Salt Lake City.—p. 1279.

New Method of Recording Physiologic Activities: II. Simultaneous Recording of Maternal Respiration, Intra-Uterine Fetal Respiration and Uterine Contractions. C. Fenning and B. E. Bonar, Salt Lake City.—p. 1280.

Scientific Method for Preparation of Normal Physiologic Saline Solution in Hospitals. A. G. Keller, Philadelphia.—p. 1290.

Concentration of Agglutinin in Vaccination Against Typhoid.—During the last two years, Moor and Brown have carried out a comparative study of the oral and subcutaneous administration of typhoid vaccine in 187 human subjects. Agglutination titrations were made in all cases before the vaccine was administered and again four weeks after the last dose. Typhoid vaccine administered orally produced as great or greater concentrations of agglutinin antibodies in the blood serum of human beings as that administered subcutaneously. The oral vaccine brings about this concentration of agglutinin antibodies in a shorter time. No reactions were observed following the administration of the oral vaccine. Severe reactions, causing loss of time from work, do occur when the vaccine is given subcutaneously. Generally subjects take the oral vaccine more willingly than they do the subcutaneous. Economically and practically the oral vaccine is more desirable than the subcutaneous.

Aspiration Biopsy and Distant Metastasis.—McLean and Sugiura performed repeated aspiration biopsy on 155 rats and mice into which they had transplanted Flexner-Jobling rat carcinoma and mouse sarcoma 180. They observed that moderate or excessive aspiration biopsy procedures performed repeatedly did not increase the percentage of distant metastases; nor did it produce any demonstrable damage to the capsule of the tumor or result in implantation of the tumor along the route that the needle had traversed.

Journal of Nutrition, Philadelphia

14: 223-328 (Sept.) 1937

Biologic Assay of Lactoflavine with Chicks. T. H. Jukes, Davis, Calif.—p. 223.

Assay Procedure for Vitamin K (Antihemorrhagic Vitamin). H. J. Almquist and E. L. R. Stokstad, Berkeley, Calif.—p. 235.

Sources and Nature of Chick Gizzard Factor. H. J. Almquist, Berkeley, Calif.—p. 241.

Vitamin A Activity of Butters Determined by Various Methods. M. E. Leuschen, Atchison, Kan.; Bernice L. Kunerth, M. M. Kramer and W. H. Riddell, Manhattan, Kan.—p. 247.

Influence of Some Commonly Used Salt Mixtures on Growth and Bone Development of Albino Rat. L. B. Mendel, Rebecca B. Hubbell and A. J. Wakeman, New Haven, Conn.—p. 261.

New Salt Mixture for Use in Experimental Diets. Rebecca B. Hubbell, L. B. Mendel and A. J. Wakeman, New Haven, Conn.—p. 273.

*Effect of Exercise on Metabolism Following Ingestion of Water, Glucose and Fructose, as Shown by Course of Respiratory Quotient. J. Haldi and G. Bachmann, with technical assistance of W. Wynn and J. M. Little, Emory University, Ga.—p. 287.

Vitamin E and Growth. H. S. Olcott and H. A. Mattill, Iowa City.—p. 305.

Relation of Ascorbic Acid Ingestion to Mineral Metabolism in Children. Amy L. Daniels and Gladys J. Everson, with cooperation of Olive E. Wright, Mary F. Deardorff and Florence I. Scoular, Iowa City.—p. 317.

Effect of Exercise on Metabolism.—Haldi and Bachmann studied the respiratory quotient as affected by exercise taken by two subjects immediately after the ingestion of 500 cc. of water, 50 Gm. of dextrose, 50 Gm. of fructose and a mixture of 25 Gm. of each of these two sugars dissolved in 500 cc. of water at 37 C. The exercise consisted of performing 550 kilogrammeters of work per minute for two consecutive periods of fifteen minutes on a Prony brake bicycle ergometer. In the control experiments with water the respiratory quotient rose to approximately 0.9 during exercise, an increase of 0.1 above the base line. The increase of the respiratory quotient during exercise was practically the same when the sugars were ingested as when water alone was taken immediately before the exercise. The rise in the respiratory quotient during exercise in the experiments with water and the sugars shows that there was an increase in the relative and absolute amount of carbohydrate oxidized. The percentage of carbohydrate oxidized was not increased by the ingestion of the sugars immediately before exercise. Dextrose and fructose were equally ineffective in raising the percentage of carbohydrate oxidized during exercise. There was more carbohydrate oxidized in the second than in the first exercise period. During the first recovery period in the control experiments with water the respiratory quotient remained at practically the same level as during exercise, indicating that the increase in carbohydrate metabolism induced by exercise persisted for a few minutes afterward. In the experiments with the sugars there was rise in the quotient during the first recovery period above the level reached during exercise. The greatest rise occurred in the experiments with a mixture of the sugars, the least in those with dextrose. Exercise accelerated the metabolism of dextrose, whereas it had no effect on that of fructose. As the ingested dextrose did not increase the total carbohydrate oxidation during exercise, it must have had a greater sparing effect than fructose on the body stores of carbohydrate.

Journal of Urology, Baltimore

38: 251-330 (Sept.) 1937

Adenoma of Adrenal Gland Associated with Grawitz Tumor of Kidney. W. Rosenberg, Cleveland.—p. 251.
Duplication of Lower Ureter Ending Blindly. I. R. Sisk and P. Kundert, Madison, Wis.—p. 261.
Brain Metastasis in Carcinoma of Bladder. W. F. Leadbetter and J. A. C. Colston, Baltimore.—p. 267.
Leiomyosarcoma of the Bladder: Report of Case and Review of Literature. A. F. Weyerbacher and J. F. Balch, Indianapolis.—p. 278.
*New Methods of Preoperative Study in Prostatic Hypertrophy. C. H. deT. Shivers, Atlantic City, N. J.—p. 288.
Tricuspid Endocarditis Following Urethral Dilatation (Probably Gonorrheal). N. F. Ockerblad and H. E. Carlson, Kansas City.—p. 300.
The Perennial Prostate. J. F. McCarthy, New York.—p. 306.
Primary Carcinoma of the Male Urethra. F. O. Harbach, Syracuse, N. Y.—p. 311.
Hormone Excretion in Cases of Prostatic Hypertrophy. H. P. Rusch and P. R. Kundert, Madison, Wis.—p. 316.
Advantages of Punch Method of Removing Obstructing Portions of the Prostate. H. C. Bumpus Jr., Pasadena, Calif.—p. 322.
Modification of Evacuator. M. Ellik, Iowa City.—p. 327.

Preoperative Study in Prostatic Hypertrophy.—Shivers states that during the last three years it has been the practice at the urologic department of the Atlantic City Hospital to add to the preoperative study of the hypertrophic prostate a routine intravenous urogram and a cystoscopic grading of all prostates, taking into consideration the shortcomings of each procedure. It was found that by intravenous urography the presence or absence of renal excretion, the promptness of excretion, the degree of concentration and the presence or absence of gross changes (hydronephrosis) in the upper part of the urinary tract could be determined with a fair degree of accuracy. The author strongly advises against retrograde pyelograms in the presence of prostatic hypertrophy even when it is mechanically possible to introduce ureteral catheters, as there is always great danger of activating a latent infection in one or both kidneys. The physical examination should never be neglected even though intravenous urography is regularly practiced. In cases showing gross renal changes in the presence of a persistent pyuria, resection should be done even though all other tests are within normal limits. In every case of latent chronic infection of the upper part of the urinary tract with definite gross changes, as shown by the urogram, resection should always be preceded by a suprapubic cystotomy. A patient who will not tolerate a suprapubic cystotomy will frequently not survive a prostatic resection. At a suitable time after suprapubic drainage, resection may be carried out without endangering the patient's life. Kirwin recommends resection in cases showing marked renal impairment and other constitutional complications. The author does not agree with this recommendation if impairment of renal function is due to infection. Patients with changes in the upper part of the urinary tract, whether they are bilateral or unilateral, do much better with a two-stage prostatectomy. Urethral drainage does not seem to be adequate in these patients and, as the risk is greater, the two-stage procedure is definitely safer. A system of cystoscopic grading has been adopted which has been most helpful in selecting the type of gland best suited for resection.

Medical Bull. of Veterans' Adm., Washington, D. C.

14: 103-206 (Oct.) 1937

Management of Irritable Colon (Mucous Colitis). J. A. Bargen.—p. 103.
Multiple Sclerosis. C. R. Jackson.—p. 105.
Psychosis with Multiple Sclerosis. W. H. Malone.—p. 113.
Neurologic Sequels of Spinal Anesthesia. M. M. Barship.—p. 118.
Treatment and Course of Neurosyphilis: Case Reports. J. H. Baird, E. K. Allis and S. F. Hoge.—p. 119.
Surgical Treatment of Far Advanced Active Pulmonary Tuberculosis. J. G. Slaney.—p. 146.
Effective Counteraction of Avertin Narcosis. G. A. Resta.—p. 149.
Pancreatitis, Acute and Chronic: Case Reports. F. R. Sedgley.—p. 151.
Lobar Pneumonia (Analysis of Forty-Nine Cases). M. C. Messina.—p. 157.
Syphilis of the Lungs. W. E. Hamlin.—p. 161.
*Consideration of Gingivitides and Oral Spirochetoses, with Mercurial Treatment for Vincent's Infection and Noma. O. A. Grove.—p. 164.

Gingivitides and Oral Spirochetoses.—Grove believes that oral hygiene offers the most successful weapon in diminishing the incidence of gingivitis and Vincent's angina. Surgical asepsis is indicated whenever tissues are broken, severed or bruised or the continuity of the epithelial cells is disrupted in any manner. Pyorrhea cannot be cured or controlled by the present passive methods of approach. It has been estimated that 15 per cent of the work involves operative work by the dentist, and 85 per cent rests entirely on the oral hygienic habits of the patient. To maintain a cure in pyorrhea, it would seem necessary that the patient use an alkaline mouthwash daily, one that aids in the removal of material harboring microorganisms and one that will penetrate into the subgingival and other spaces. Frequently persons who have been regularly under dental supervision present themselves for treatment of pyorrhea which has been years in developing, so that it is too late to save the teeth, owing to the involved systemic conditions, such as arthritis, secondary to focal infection. The same organisms are responsible for gingivitis, pyorrhea, Vincent's infection, noma and Ludwig's angina. Mercury in the form of its insoluble salt (calomel) as a systemic spirocheticide, proper elimination of body waste material with salts, and the use of hydrogen peroxide as a local oxidizing agent offer simple, agreeable and effective treatment for the diseases caused by the Vincent spirochete.

Nebraska State Medical Journal, Lincoln

22: 285-324 (Aug.) 1937

Dangers and Technic of Spinal Puncture. J. J. Keegan, Omaha.—p. 285.
*Preventing Recurrent Anorectal Fistula. R. R. Best, Omaha.—p. 288.
Conservative Treatment of Surgical Kidney Disease. P. S. Adams, Omaha.—p. 292.
Traumatic Abdomen. J. D. Bisgard, Omaha.—p. 294.
Hard of Hearing School Children. C. T. Uren, Omaha.—p. 300.
Arsenical Poisoning Traced to Flour. J. Buis, Pender.—p. 302.
Postoperative Heat Stroke. H. H. Everett and R. H. Whitham, Lincoln.—p. 304.
Personal Experiences with Obstetric Analgesia. D. Findley, Omaha.—p. 307.
Dermatitis Venenata. D. J. Wilson, Omaha.—p. 310.
Review of Sixty-Four Cases of Pernicious Anemia. E. B. Reed, Lincoln.—p. 312.

22: 325-364 (Sept.) 1937

Responsibility of the Official Agency in Maternal and Child Health. J. W. Bell, Lincoln.—p. 325.
Treatment of Pyelitis as Serious Complication of Pregnancy: Case Report of Five Deaths. J. R. Reinberger and R. E. Anderson, Memphis, Tenn.—p. 328.
Modern Prenatal Care. B. R. Farner, Norfolk.—p. 333.
Puerperium, Immediate and Remote. H. S. Morgan, Lincoln.—p. 337.
Preventive Pediatrics for the Practicing Physician. E. J. Huenekens, Minneapolis.—p. 339.
Value of Convalescent Serum in Acute Contagious Diseases. C. M. Hyland, Los Angeles.—p. 342.
Differential Diagnosis of Anemias in Infants and Children. R. B. Eldredge, Omaha.—p. 348.

Preventing Recurrent Anorectal Fistula.—Best gives three steps in the prevention of recurrent anorectal fistula: (1) the attempt to establish the internal opening definitely before operation (which is occasionally impossible even after repeated attempts), (2) the correct operative procedure with direct attack on the internal opening and (3) proper postoperative care. A fistula with its external orifice situated behind a plane passing transversely through the center of the anus usually has its internal opening in the midline posteriorly or just to one side of the midline, while a fistula with its external aperture in front of this plane generally terminates immediately opposite this external opening. The internal stoma is usually found in a diseased crypt, the margins of which are inflamed, edematous or ragged, or it may be identified by a drop of pus, a small tuft of granulation tissue, a papule, or at times merely a small injected area. The questionable region should always be examined with a small hooked probe. If no internal aperture is found and no diseased crypt exists, one must assume that the tract is not complete and excise all tissue down to the depth of the fistula. Here the discoloration of the diseased tissue by the methylene blue solution more clearly identifies any small ramifications. The existence of incomplete or blind internal fistulas is controversial, but that these actually occur at times cannot be denied. A blind fistula may develop in this region just as a blind sinus tract may occur elsewhere in the body. Before finally assuming that a fistula is a blind external type, one should make repeated attempts to locate the internal stoma over a period of weeks, and, if not found, great care and ingenuity must be exercised at operation before concluding that no internal opening exists.

New England Journal of Medicine, Boston

217: 503-540 (Sept. 23) 1937

Comments on Certain Aspects of Rheumatic Fever and Rheumatic Heart Disease. L. A. Conner, New York.—p. 503.
An Analysis of the 1935 Epidemic of Infantile Paralysis in Massachusetts. A. T. Legg, Boston.—p. 507.
Cerebral Fat Embolism: Report of Case. A. J. D'Elia and M. R. Moore, Norwich, Conn.—p. 511.
Nutrition, Health and Disease. F. L. Burnett, Boston.—p. 515.

New Orleans Medical and Surgical Journal

90: 113-174 (Sept.) 1937

Introduction of Leprosy into Louisiana, and the First Leper Hospitals. T. J. Dimitry, New Orleans.—p. 113.
Delayed Operation for Acute Hematogenous Osteomyelitis. H. R. Mahorner, New Orleans.—p. 121.
*Paratyphoid and Related Bacteria in Cutaneous and Subcutaneous Lesions. G. Fasting, New Orleans.—p. 130.
The Present Status of Serum Therapy in Pediatrics. J. H. Hess, Chicago.—p. 134.
Transurethral Prostatectomy. G. J. Thompson, Rochester, Minn.—p. 142.
Recent Advances in Anesthesia. E. B. Tuohy, Rochester, Minn.—p. 145.
Airway and Airways in Relation to General Anesthesia. A. M. Caine, New Orleans.—p. 148.
Incidence of Congenital Heart Disease in the Charity Hospital of New Orleans. J. T. Roberts, Cleveland.—p. 153.
Pregnancy in Active Sickle Cell Anemia. W. A. Sodeman and G. E. Burch, New Orleans.—p. 156.

Paratyphoid and Related Bacteria in Cutaneous Lesions.—A recent instance with fatal termination, caused by Salmonella morgani in association with nonhemolytic streptococci and staphylococci, led Fasting to a reexamination of several somewhat similar infections observed at the Charity Hospital since May 1936. Of the six cases reported, two patients died, a leg was amputated in one, infection of the hand with necrosis into the metacarpal bones occurred in one, a compound fracture was lanced in one, and in the remaining case there were extensive ulcerations on one leg. In one fatal case the complications were diabetes and a chronic bacillary dysentery. In the second fatal case a mixed infection followed an injury to the right knee. Marked arteriosclerosis was present in the case in which amputation of a leg was necessary. In the remaining three cases there were no obvious complicating constitutional factors. In the two fatal cases more than 1,000 cc. of pus was evacuated from fluctuating masses in the thighs. In four instances the extraneous source of infection seemed evident. In one case the hematogenous route was fairly definite, as the abscess formed in the thigh during the patient's stay in the hospital. In the sixth case the source remains doubtful. Cultures of the stools and urine failed to reveal these as possible sources of surface pollution. No difficulties were experienced in the isolation and culture of the bacilli in these cases. The micro-organisms isolated had characteristics of the Morgan bacilli. Serologically two strains appear related to paratyphoid B and the aertrycke strains. The immunologic response to these organisms differs from common pyogenic infections. A greater interest in reporting clinical cases with similar infections will assist in a better classification and encourage the study of the immune processes involved.

Northwest Medicine, Seattle

36: 295-332 (Sept.) 1937

Future Medical Demands. A. C. Crookall, Seattle.—p. 295.
The Management of the Vomiting Child. F. C. Rodda, Minneapolis.—p. 298.
Cancer of the Breast in the Young. L. L. Nunn, Vancouver, Wash.—p. 301.
Carcinoma of the Pancreas. S. F. Herrmann, Tacoma, Wash.—p. 304.
Antisyphilitic Treatment in a Public Clinic. S. M. Creswell and T. J. Porro, Tacoma, Wash.—p. 307.
Regional Ileitis: Report of Case with Perforation and Generalized Peritonitis. M. H. Querna, Spokane, Wash.—p. 311.
Fröhlich's Syndrome (Dystrophia Adiposogenitalis). E. A. Pierce, Portland, Ore.—p. 312.
Religion of Medicine. A. H. Peacock, Seattle.—p. 315.

Oklahoma State Medical Assn. Journal, McAlester

30: 319-350 (Sept.) 1937

Why Look for Tuberculosis? C. Puckett, Oklahoma City.—p. 319.
Tuberculosis of the Throat. H. J. Evans, Tulsa.—p. 322.
Tuberculosis from the General Practitioner's Standpoint. R. M. Shepard, Tulsa.—p. 325.
Renal Tuberculosis: Clinical Study. D. W. Branham, Oklahoma City.—p. 328.
Poliomyelitis. B. H. Nicholson, Oklahoma City.—p. 330.
Orthopedic Management of Anterior Poliomyelitis. D. H. O'Donoghue, Oklahoma City.—p. 334.

Pennsylvania Medical Journal, Harrisburg

40: 1017-1230 (Sept.) 1937

Genesis and Surgical Treatment of Essential Hypertension. G. Crile, Cleveland.—p. 1017.
Clinical and Pathologic Study of Acute Pulmonary Embolism and Thrombosis. B. L. Crawford and H. K. Mohler, Philadelphia.—p. 1020.
Carcinoid Tumors of Stomach. R. M. Entwisle, Pittsburgh.—p. 1026.
Three Major Complications of Acute Hemorrhagic Nephritis in Children: Their Prevention and Treatment. M. I. Rubin and M. Rapoport, Philadelphia.—p. 1029.
Chemical Conjunctivitis of the New-Born: Its Cause, Prevention and Treatment. L. P. Glover, Altoona.—p. 1035.
Diagnosis and Treatment of Carcinoma of Esophagus. H. R. Decker, Pittsburgh.—p. 1038.
Pulmonary Suppuration. W. E. Burnett, Philadelphia.—p. 1045.
Acute Psychosis Associated with Coronary Thrombosis. J. B. Wolffe and A. Silverstein, Philadelphia.—p. 1052.
Classification of Blood Dyscrasias. G. J. Kastlin, Pittsburgh.—p. 1056.
Lymphoblastomas and Case of Leukosarcoma. M. W. Rubenstein, Pittsburgh.—p. 1062.
Wilms' Tumor: Report of Two Cases. D. P. Ray, Johnstown.—p. 1068.
Brain Abscess: Report of Cases. J. R. Simpson, Pittsburgh.—p. 1071.

Philippine Islands Med. Association Journal, Manila

17: 445-510 (Aug.) 1937

Esophagus Diverticle and Its Roentgenologic Differential Diagnosis. P. S. Chikiamco, Frankfort-on-Main, Germany.—p. 445.
Clinical Observations on Oxyperitoneum for Intestinal Tuberculosis. K. Uchikura, H. Ito and N. Yabe, Tokyo, Japan.—p. 449.
Chorionepithelioma: Report of Six Recovered Cases. Honoria Acosta-Sison and J. S. Galang, Manila.—p. 457.
Bronchoscopy Minded. V. C. Alcantara and G. de Ocampo, Manila.—p. 465.

Public Health Reports, Washington, D. C.

52: 1297-1328 (Sept. 17) 1937

Disabling Illness Among Industrial Employees in 1936 as Compared with Earlier Years. D. K. Brundage.—p. 1297.
Occupational Diseases Occurring in Factories and Workshops of Great Britain, 1936. W. M. Gafafer.—p. 1303.
*Removal of Fluoride from Water. E. Elvove.—p. 1308.
A New Ocular Micrometer for Use in Dust Counting: Note. R. T. Page.—p. 1315.

Removal of Fluoride from Water.—Elvove finds that fluoride can be removed from water with the aid of tricalcium phosphate, magnesium oxide or magnesium hydroxide. As magnesium oxide appears to be the least expensive, experiments have been conducted mostly with this substance. The fluoride-containing water (5 parts per million) to be treated was introduced into tall bottles. The quantity of the magnesium oxide used corresponded to one ounce per gallon of water in each bottle. The magnesium oxide and water were then actively agitated, by means of a current of air, for about half an hour. After complete settling, about three fourths of the column of water was siphoned off, replaced by a fresh supply of the fluoride-containing water, and the process repeated. The removal of fluoride in the first three runs was 4.3 to 4.8 parts per million. The fifth to the seventeenth runs, in the case of the calcined magnesite, yielded a composite sample that showed a fluoride removal of about 2.1 parts per million, while in the case of the light magnesium oxide the sixth to the seventeenth runs yielded a composite water that showed a fluoride removal of about 2.9 parts per million. With a composite water which had received one treatment, the residual fluoride in the mixture obtained from eleven runs with a second portion of magnesium oxide was reduced to about 1 part per million or less. The fluoride-removing power of the magnesium oxides, however, was not yet completely exhausted. In the subsequent twenty-five runs with the magnesium oxide that had already been used in seventeen runs there was a further removal of fluoride, corresponding to an average of about 0.8 part per million in the case of the calcined magnesite and to about 1.8 parts per million in the case of the light magnesium oxide. Different grades of commercial magnesium oxide showed different degrees of fluoride-removing power. Although a commercial light magnesium oxide was found more efficient as a fluoride remover, per given weight, than a commercial calcined magnesite, its greater efficiency was not proportional to its higher cost. In the case of the calcined magnesite particularly, since it is used extensively in building operations and for various other purposes, it may be possible to utilize the material after its availability for removing fluoride has been exhausted and thus indirectly reduce the cost of treatment.

Review of Gastroenterology, New York

4: 160-267 (Sept.) 1937

Ways of Improving Gastro-Enterology. W. C. Alvarez, Rochester, Minn. —p. 160.
Biochemical Changes in Organism Produced by Massive Intra-Intestinal Hemorrhage. T. Christiansen, Copenhagen, Denmark.—p. 166.
Surgery of the Stomach. T. H. Russell, New York.—p. 181.
Rôle of Duodenobiliary Drainage in Duodenal Ulcer and Biliary Tract Disease. N. W. Elton, Reading, Pa.—p. 196.
Lymphopathia Venerea. C. F. Martin, Philadelphia.—p. 207.
Postanal Infections. H. Z. Hibshman, Philadelphia.—p. 213.
Appendicitis Obliterans Totalis: Report of Case. W. B. Christie, Boston.—p. 215.
Mobile Duodenum. R. Upham, New York.—p. 217.
Lymphosarcoma of Stomach with Pain-Food-Ease Rhythm of Three Months' Duration: Report of Case. M. Golob, New York.—p. 228.
Chronic Interstitial Enteritis. M. Kraemer, Newark, N. J.—p. 239.

Texas State Journal of Medicine, Fort Worth

33: 345-408 (Sept.) 1937

The Public Health Control of Syphilis. T. Parran, Washington, D. C. —p. 351.
Essential Elements of a Public Health Program for Control of Syphilis. J. W. Bass, Dallas.—p. 354.
Treatment of Early Syphilis: Public Health Control Measure. E. C. Fox, Dallas.—p. 359.
Diagnosis and Treatment of Late Syphilis. L. B. Duggan, Houston.—p. 363.
Importance of Standardized Laboratory Tests in Syphilis Control. A. G. Schoch, Dallas.—p. 366.
New Era in Treatment of Diabetes with Improved Insulin Compounds. F. H. Kilgore and W. S. McDaniel, Houston.—p. 369.
Aortic Aneurysm in Childhood: Case Report, with Some General Remarks on Desirability of Reporting Rare Cases. J. F. Pilcher, Galveston.—p. 373.
*Mental Disturbances Due to Bromide Intoxication: Clinical Study of Twenty-Three Cases. T. H. Cheavens, C. F. Carter and J. S. Bagwell Jr., Dallas.—p. 375.
Amebiasis: Its Diagnosis and Management. W. G. Reddick and H. E. Wright, Dallas.—p. 380.
Prevention, Diagnosis and Treatment of Typhoid Fever. N. Simpson, Waco.—p. 384.
Vicarious Menstruation: Report of Unusual Case. G. A. King, Cuero. —p. 388.
The Dallas Syphilis and Venereal Disease Clinic. A. G. Schoch and R. W. Manar, Dallas.—p. 390.

Mental Disturbances Due to Bromide Intoxication.—Since November 1933 Cheavens and his colleagues have made a study of all cases admitted to the hospital showing evidence of toxemia. The history of previous administration of bromide, as well as the presence of stupor, confusion, hallucinations and disorientation has been considered an indication for the laboratory determination of the blood bromide content. They found significant amounts of bromide in the blood of twenty-three patients in 555 consecutive admissions. It appears that in the more severe bromide intoxications the symptoms and signs of toxic delirium predominate to a sufficient extent to permit clinical recognition in a considerable number of cases. This is not true in the milder forms of bromide intoxication. Hallucinations were present in sixteen of the seventeen patients whose blood contained more than 150 mg. of bromide per hundred cubic centimeters; confusion and disorientation occurred in fifteen. Six of these patients were found to be in some degree of stupor. In the group with less than 150 mg. only one patient was found with hallucinations. The remainder presented essentially the symptomatology of the underlying illness for which the bromide was administered. As the patient with a severe bromide intoxication recovers, the symptomatology tends to change, with the evidence of the underlying illness again coming into prominence. This is particularly true when the underlying illness is a protracted or severe mental disturbance. Excluding the factor of the underlying illness, the symptoms in these cases are sufficiently uniform to suggest the possibility of a bromide intoxication, and with the laboratory determination of bromide in the blood there should be little trouble in selecting these cases from any group of mental disturbances. The neurologic signs did not show the same degree of uniformity, offering little help in making the diagnosis. Defects of speech, disturbances of gait and occasional pupillary disturbances were the most prominent conditions and these were found in only a small number of cases. One of the most serious objections to the continued administration of the bromides is that, once a toxemia is established, there is great likelihood of a prolonged illness in a mental hospital. In contrast to intoxications with other drugs, there is little doubt that the bromide patient will be ill for a much greater period. The most frequent source of bromides in the series continues to be the physician's prescription. Since the accumulation of bromide in the body occurs at the expense of the body chlorides, the treatment is logically based on the administration of chloride. In addition, the administration of large amounts of water assists in the excretion of bromides as well as tending to remedy the serious state of dehydration which many patients present. The withdrawal of all sedatives seems to be the best procedure. For the determination of bromide concentration about 15 cc. of blood is collected by venous puncture, allowed to clot and centrifugated. Five cc. of the clear serum is removed and added to 10 cc. of water in a small flask; then 3 cc. of a 20 per cent solution of trichloroacetic acid is added, shaken and allowed to stand for thirty minutes. This is filtered clear. Standards are prepared by adding to 10 cc. amounts of water 5 cc. of standards I and II (standard I contains 100 mg. of sodium bromide to 100 cc. of water and standard II contains 200 mg.). To each standard 3.6 cc. of a 0.5 per cent solution of gold chloride is added and to each cubic centimeter of the filtrate 0.2 cc. is added. The standard is set at 20 and compared; 100 (or 200 if standard II is used) times the reading of the standard divided by the reading of the unknown gives the amount of bromide expressed as sodium bromide in 100 cc. of serum.

Virginia Medical Monthly, Richmond

64: 299-364 (Sept.) 1937

Prevalence and Incidence of Venereal Diseases in Richmond, Va., with Recommendations. Lida J. Usilton and R. A. Vonderlehr, Washington, D. C.—p. 299.
Venereal Disease Program in Richmond with Recommendations for Suggested Changes. L. E. Burney and R. A. Vonderlehr, Washington, D. C.—p. 307.
Modern Aspects of Hematology. J. H. Scherer, Richmond.—p. 316.
*The Tobacco Heart. H. Golston, Roanoke.—p. 319.
Prevention and Treatment of Fracture Deformities of Lower End of Radius. A. R. Shands Jr. and C. R. Duncan, Durham, N. C.—p. 325.
Physiologic Disturbances of Erect Posture. R. J. Main, Richmond.—p. 330.
Some Observations in Eighty Cases of Head Injury. T. N. Spessard, Roanoke.—p. 334.
Acute Carbon Monoxide Asphyxia. F. F. Davis, Roanoke.—p. 337.
Studies on Oxyuriasis: II. Preliminary Note on Treatment with Tetrachlorethylene. W. H. Wright, J. Bozicevich and J. Rose, Washington, D. C.—p. 339.
Effects of Intravenous Acetyl-Beta-Methylcholine on Paroxysmal Auricular Flutter. N. Blom and Grace Cashon, Richmond.—p. 341.
The Relation of the Hospital to Medical Education and Medical Practice as Discussed in "American Medicine." W. B. Porter, Richmond. —p. 342.

The Tobacco Heart.—Golston reviews the opinions of men who have studied the physical effects of smoking and cites two cases, one of a unifocal irritation and the other multifocal in its action on the cardiac muscle. From the literature he culled the following effects on circulation, resulting from tobacco: 1. A lowered cardiac efficiency, with a diminished power of the heart to stand strain, and in some cases the excitation of premature or arrhythmic rhythm. This was demonstrated by the two case histories presented. Young adults recover quickly with the cessation of tobacco. It is conceivable that the continued use of tobacco may cause the development of an organic heart. 2. Vasoconstriction, as a contributing cause of death in organic arterial disease. Smoking is not shown to be a cause of hypertension, although the blood pressure may be temporarily slightly elevated, and thus not necessarily forbidden. Coronary sclerosis and angina pectoris are not significant except in subjects showing cutaneous reaction to nicotine-free tobacco or a toxic manifestation. 3. In peripheral vascular diseases, such as thrombo-angiitis obliterans, Reynaud's disease and intermittent claudication, tobacco is forbidden. With these facts in mind the author quotes Cornwall: "The tobacco heart appears to be mostly a matter of symptoms and functional disturbance, but one must not forget that a functional condition continuously abused through abnormal physiology may result in permanent structural changes. Tobacco, therefore, must be considered a toxic agent and our guiding rule must be the reactions as exhibited by our patients."

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

Archives of Disease in Childhood, London

12: 193-266 (Aug.) 1937

Pellagra in African Children. H. C. Trowell.—p. 193.
Vitamin B_1 Deficiency in Infancy: Critical Review. M. R. Price.—p. 213.
Variations in First Heart Sound and Auriculoventricular Conduction Time in Children with Rheumatic Fever. J. D. Keith.—p. 217.
Dysentery in Infancy. I. A. Sabri, M. A. Abboud and M. Ali.—p. 225.
Erythema Marginatum (Rheumaticum). C. B. Perry.—p. 233.
Acute Myeloid Leukemia in One of Identical Twins. C. E. Kellett.—p. 239.
*Prognosis in Rheumatoid Arthritis in Childhood. T. Colver.—p. 253.

Prognosis in Rheumatoid Arthritis in Childhood.—Colver presents an analysis of the prognosis of rheumatoid arthritis in sixty-nine children; two presented symptoms in the first year of life, fourteen in the third year with a maximal incidence in the preschool period between 2 and 5 years. Sixty per cent of the patients were girls. Follow-up enquiries were successful in forty-nine patients; of these, twelve are known to have died, eighteen are still active and nineteen are quiescent. The criteria of quiescence have been an absence of joint pain and tenderness for a period of not less than two years, and a blood sedimentation rate within normal limits. In no instance have symptoms recurred after a quiescent period of eighteen months. Each of the patients who died had first developed the condition when less than 5 years of age and, with one exception, each one had died within three years of the onset. The disease is thus most dangerous in the acute stages in young children. In the five fatal cases in the hospital in which a necropsy was performed there was a progressive emaciation and anemia, the patient gradually being reduced to an almost prostrate condition. In two cases there was a terminal streptococcic septicemia (hemolytic), in one a large renal calculus and heavy urinary infection. A fourth showed advanced amyloid disease and extreme pericardial adhesions. In the fifth the necropsy revealed nothing of note apart from extreme emaciation and moderate pericardial adhesions. Pneumonia has been cited as the cause of death in most of the patients who died elsewhere. With two exceptions, of the nineteen quiescent patients every one can earn a livelihood. With one exception every patient can walk. Seven of the nineteen have completely recovered and a further four patients have recovered to all intents and purposes but full passive movement in one or two joints occasions slight discomfort. Eight old cases show some crippling, but in only two of these is the ability to earn a livelihood lost. Of the thirty-seven surviving patients in not one has the duration of activity exceeded seven years. The disease thus appears to be self limited and in a given case one feels justified in predicting the cessation of activity within a maximal period. The duration of the active phase is one of the most important factors in estimating the prognosis and apparently three years of activity is the critical period. If after three years the disease is active, the risk of a fatal outcome is negligible but the chance of complete recovery of function has almost disappeared. In the patients who recovered completely the disease ran a relatively short course, never longer than three years (twenty months was the shortest duration) and the end results also show that, when the disease was active for more than three years recovery was not complete.

British Journal of Ophthalmology, London

21: 465-528 (Sept.) 1937

Five Unusual Cases of Proptosis. R. F. Moore.—p. 465.
William Porterfield, M.D. R. R. James.—p. 472.
Surgical Treatment of Chronic Glaucomatous Ocular Hypertension. H. Lagrange.—p. 477.
*Use of Radon in Treatment of Metastatic Carcinoma of the Choroid. P. J. Evans.—p. 496.
Familial Macular Colobomas. P. J. Evans.—p. 503.
Eyelash in Anterior Chamber Following Removal of Intra-Ocular Foreign Body. W. J. B. Riddell.—p. 506.

Radon in Treatment of Carcinoma of Choroid.—Evans describes a case of the unusual development of a metastatic carcinoma, secondary to that of the breast, in both eyes, appearing in one eye two months before its occurrence in the other. The first eye was excised, the fellow eye at that time being normal. The second eye was treated by the application of radon seeds. In spite of evidence of further metastases the patient remains remarkably well in general condition and, although losing weight, is still active nearly five years after the original operation on the breast and still retains good vision twelve months after the incidence of choroidal metastasis in the remaining eye. The malignant condition of the eye treated by radon was confirmed in that the pathologic changes were exactly similar in appearance.

British Journal of Physical Medicine, London

12: 89-114 (Sept.) 1937

Some Clinical Results with Short Wave (6 Meters). Winifred Peacey.—p. 90.
Infra-Red Rays. A. P. Cawadias.—p. 92.
Electromedical Apparatus: Its Character, Operation and Care; IV. Use of Current from the Mains for Electromedical Appliances. L. G. H. Sarsfield.—p. 97.
Pistany Mud and Treatment of Rheumatic Disorders: Analytic, Biologic and Clinical Evidence. H. Doerner.—p. 100.

British Medical Journal, London

2: 403-438 (Aug. 28) 1937

Heredity and Constitution in Etiology of Psychic Disorders. E. Kretschmer.—p. 403.
Physiologic Bases of Nutrition. S. J. Cowell.—p. 406.
Rôle of Heterophoria in Binocular Disharmony, with Especial Reference to Air Pilotage. P. C. Livingston.—p. 409.
*Action of Meat Extracts and Related Substances as Gastric Stimulants in Man. W. R. Boon.—p. 412.
Treatment of Spastic Paralysis. F. H. Mills.—p. 414.

Meat Extracts as Gastric Stimulants.—To establish the action of meat extracts and related substances on the gastric mucosa, Boon carried out a series of experiments on medical students. Various test meals were given to the subject on different days and the responses compared. The substances examined were beef powder, extracted beef, direct meat extract, commercial meat extract and sodium glutamate. The tests were performed on a fasting stomach. Beef powder, which represents whole meat, produces a marked secretion of hydrochloric acid over a long period. The watery extract is not so powerful, producing a secretion not much greater than that of gruel. Extracted beef is even less efficient. The most effective stimulant was the commercial meat extract. Sodium glutamate leaves the stomach so quickly that its effect on hydrochloric acid secretion is negligible. Beef powder delays the emptying time considerably as compared with gruel. Extracted beef and direct extract are not significantly different in their emptying times from that of gruel. Sodium glutamate makes the stomach empty very quickly. The extracted beef produced a very marked flow of mucus; in one case this was so great as to block the stomach tube. The secretion of pepsin is high when beef powder is administered. Of the substances examined it was the only one which stimulated the gastric mucosa to secrete pepsin. The other substances do not differ greatly from one another in their effect on secretion of pepsin, sodium glutamate being a possible exception. Following acute illnesses there is commonly a depression of gastric secretion; in such instances meat extracts, by stimulating the mucosa to an increased flow of hydrochloric acid, restore the gastric juice to normal.

Edinburgh Medical Journal

44: 561-620 (Sept.) 1937

*Pulmonary Tuberculosis in Children. Agnes R. Macgregor and W. A. Alexander.—p. 561.
Primary Thrombosis of Axillary Vein. M. M. Cruickshank.—p. 597.
The Swedish System of State Medicine. W. A. D. Adamson.—p. 603.

Pulmonary Tuberculosis in Children.—Macgregor and Alexander show that in 333 cases of fatal tuberculosis of all forms examined after death during the period from 1922 to 1935 the disease was found to have originated in the thorax in 60 per cent; while, when the last six years of the period are considered separately, the primary thoracic infections rise to 69 per cent. Of the 200 cases of primary thoracic tuberculosis, approximately 80 per cent terminated with meningitis and so would in most instances appear in registrars' statistics as cases of nonpulmonary tuberculosis. The true frequency of primary tuberculous infection of the lungs in childhood should be clearly recognized, for in the majority of such cases the route of infection is the respiratory tract and the source

of infection a human one, often a member of the child's family. The development of the disease in the lungs following a first infection is described in three stages: (1) the "primary complex," by which is understood the original focus in the lung, and the lesions produced in the regional lymph glands secondary to it, (2) localized extensions of the disease in the lung, arising from the primary complex and (3) more widespread disseminations of disease throughout the lungs, representing the advanced and often terminal stages of the process.

Glasgow Medical Journal

10: 41-88 (Aug.) 1937

*Wassermann Reaction in Maternity Work. C. Mackay.—p. 41.
Ectopic Kidney. A. M. Clark.—p. 45.

Wassermann Reaction in Maternity Work. — Mackay reports the results obtained in the routine examination of 1,000 maternity cases, in which the maternal blood and the fetal placental blood were submitted to the Wassermann reaction. Not one of the nineteen positive cases gave a history indicative of syphilis; ten patients made no complaint of any kind; two complained of varicose veins, and in the others the complaint consisted of pleuritic pain, abdominal pain, vaginal discharge and symptoms which might well be associated with cystitis and with a mild albuminuria; one gave a history of slight repeated attacks of antepartum hemorrhage. A year after the pregnancy, twelve of the total of nineteen mothers whose blood had given a positive reaction were again seen. On repetition of the test, in all instances the reaction was still positive. Nine children were alive and reported to be well; three had died. Of the twelve mothers interviewed, two had not attended the venereal clinic to which they had been directed. Data are given which are roughly in agreement with those of syphilis in the whole population and show that there has been a remarkable fall in the incidence of syphilis in maternity patients. Of the nineteen cases nine showed a positive reaction in the child. There was no instance of a positive reaction in the child and a negative reaction in the mother. In applying the Wassermann test as a routine in maternity work it is of much greater value to submit the maternal blood to the test than the fetal (placental) blood.

Indian Medical Gazette, Calcutta

72: 457-520 (Aug.) 1937

*Surgical Treatment of Nonparalytic Squint. E. O. Kirwan.—p. 457.
Comparative Study of Action of Atabrine and Atabrine Plasmochin Combination on Indian Strains of Malaria: Part II. R. N. Chopra, R. T. M. Hayter and B. Sen.—p. 458.
*Stable Solution of Antimony for Treatment of Kala-Azar. L. Everard Napier, R. N. Chaudhuri and M. N. Rai Chaudhuri.—p. 462.
Insulin Anaphylaxis. J. P. Bose.—p. 465.
Letzko's Operation as Treatment for the "Failed Forceps" Case. J. F. Shepherd.—p. 466.
Treatment of Plague Cases with Convalescent Human Serum. J. N. Norman-Walker.—p. 469.
Study of Thirty-Nine Cases of Auricular Fibrillation. T. K. Raman.—p. 473.
Arsenic in Human Tissues and Excretes. K. N. Bagchi and H. D. Ganguly.—p. 477.

Surgical Treatment of Nonparalytic Squint.—Kirwan states that in Bengal extreme degrees of concomitant squint, both convergent and divergent, are very common. The convergent varieties can always be cured and in the case of divergent ones excellent results can be obtained provided the vision is good in each eye. In eleven of the twelve cases that he records he obtained good results by a single operation on the muscle of one eye. The more usual types of surgical treatment carried out in the eye infirmary consist of (1) resection with advancement combined with recession of the opposing muscle, (2) resection with advancement combined with partial tenotomy and (3) simple advancement or simple recession in moderate degrees of squint.

Stable Solution of Antimony for Treatment of Kala-Azar.—Napier and his associates have used a pentavalent compound of antimony, containing 20 mg. of antimony (metal) in 1 cc. of solution, in the treatment of ten cases of kala-azar. These were all Indian males. The diagnosis was made in every case by the finding of the parasite, usually by spleen puncture but in one case by liver puncture. The cases were not selected, except that one patient with pneumonia and kala-azar and another with pulmonary tuberculosis and kala-azar were excluded; otherwise, consecutive previously untreated persons admitted to the Indian male wards were treated with this drug. All the injections were given intramuscularly. The total amount of antimony given varied from 0.96 to 1.74 Gm., administered in from eight to ten injections (daily or on alternate days). In no case did a high fever continue for more than nine days. The spleen was markedly reduced and in no case was it more than 2 inches below the costal margin at the time of discharge. The weight increased during the patients' stay in the hospital and subsequent to the commencement of treatment: the average increase was 5 pounds (2.2 Kg.). Only one patient complained of any pain after the injection and in his case the pain lasted only an hour or so. No abscess formation or local induration was noted in any case.

Journal Obst. & Gynaec. of Brit. Empire, Manchester

44: 625-820 (Aug.) 1937

*The Precancerous Cervix. G. I. Strachan.—p. 625.
*Operation of Extroversion of Ovaries for Functional Amenorrhea, Especially of the Secondary Type. K. V. Bailey.—p. 637.
Treatment of Varicose Veins in Pregnancy. E. Solomons.—p. 650.
Study of Immediate and Remote Effects of Pregnancy on Diseases of Heart. F. Charlotte Naish.—p. 659.
Advanced Extra-Uterine Pregnancy. F. Roques and W. R. Winterton.—p. 687.
Shoulder Delivery by Breech Presentation. J. Løvset.—p. 696.
Dysgerminoma Removed During Pregnancy. F. Stabler, with pathologic description by J. G. Thomson.—p. 705.
Resorption and Action of Follicular Hormone Rubbed into the Skin. A. A. Loeser.—p. 710.
Endometrioma of Umbilicus: Two Cases. C. K. Vartan.—p. 715.
Infarct of Brain Complicating Abortion: Case. R. K. Ford.—p. 718.
Spontaneous Rupture of Uterus Following Cesarean Section: Case. R. K. Ford.—p. 721.
Locked Twins: Case. P. G. Preston.—p. 723.
Radiograms Taken During Labor from Its Onset Until the Head Is Born, Indicating Position of Anterior and Posterior Shoulders. N. A. Purandare.—p. 726.
Pregnancy After Hematocolpos. W. N. Searle.—p. 729.
Nystagmus Associated with Hyperemesis Gravidarum. J. B. Dawson.—p. 731.
Unusual Complication of External Cephalic Version. J. D. Flew.—p. 733.
Neglected Shoulder Presentation: Decapitation by the Blond-Heidler Instrument. C. M. Marshall.—p. 735.
Results in Treatment of Malignant Tumors of Female Sexual Organs, in Gynecologic Clinic of University at Amsterdam in the Years 1923 up to and Including 1931. W. P. Plate.—737.

The Precancerous Cervix.—Strachan bases his remarks on the clinical and histologic investigation of several hundred cervices removed during the last ten years, mainly for chronic inflammatory lesions. In a small proportion of these cases early carcinoma was unexpectedly found, while the examination of a further 400 cases of frank cervical carcinoma has been of corroborative value. Leukoplakia of the vulva is generally regarded as precancerous in that epithelioma supervenes in a large proportion of such cases if left untreated. The main clinical precancerous cervical lesion is produced by the various effects of chronic infection usually secondary to obstetric trauma. It is common knowledge that with a hypertrophied, everted and eroded cervix many annoying gynecologic symptoms may occur but that carcinoma may not develop; while in a cervix with quite a small eroded area and in about 5 per cent of cases, in such an area apart from obstetric trauma, carcinoma may occur. Leukoplakia of the cervix has the same relation to cancer formation as leukoplakia of the vulva or tongue. The main lesion of connective tissue which would appear to predispose to the formation of carcinoma in the cervix is subepithelial hyaline degeneration, and this is seen only in old-standing cases. A suggestive feature is a separated clump of surface epithelial cells in the connective tissue. There are several others. One of the most important of these is the type of interpapillary epithelial downgrowths. The main precancerous signs are those of overactivity of the cell columns or of the individual cells, and this is not indicated by mere multiplication of layers, which is often seen in procidentia in which carcinoma is rare. The main change that the author has been able to observe which might be regarded as precancerous is a tendency for the cervical glands to lose their racemose appearance and to revert to a simpler tubular type. This would represent a degree of metaplasia of the gland as a whole and not necessarily of the epithelium lining it. The main changes that would indicate a tendency toward carcinoma formation are to be found in slight variations in the normal structure or relations of a limited

number of cells; if such variations are marked and if the condition of metaplasia so produced involves a large proportion of the epithelial cells, a condition of early carcinoma is present. Very careful examination is thus called for, often of several sections of a particular specimen, in estimating the presence of such precancerous changes, and the first thing to be noted is the general appearance of the constituent cells. In the nonmalignant squamous epithelial cell the cytoplasm is evenly stained, but in a carcinomatous cell the stain is absorbed quite unevenly, producing a mottled appearance, and this condition is widespread in an area of carcinoma. Inequality of staining indicates a tendency to the formation of carcinoma. If mitotic figures are seen in a number of cells, it indicates the actual presence of carcinoma; if the process is limited to a cell or two with surrounding and intervening normal cells, it would indicate a precarcinomatous disposition. Actual penetration of the basement membrane is a definite sign of malignant manifestation. It is emphasized that a feature of precancerous changes is that they are limited to a few isolated cells, and it is further emphasized that in a particular cell the changes should be few. Thus, if a cell shows nuclear mitosis, hyperchromatism and increased relative and absolute size of the nucleus and nucleolus, the probability is that it is already carcinomatous, and further search will probably confirm this by demonstrating similar changes in adjacent cells. If one can identify cervical cellular changes which are not yet carcinomatous but are likely to proceed in that direction, a minor operation, such as amputation of the cervix, would save the patient from the terrors of carcinoma and thus represent prophylactic gynecology in the best sense.

Extroversion of Ovaries for Functional Amenorrhea.—Bailey performed extroversion of the ovaries in seventeen cases of secondary or functional amenorrhea, to which has been added a minor degree of endocrine therapy. The most potent extract used in this respect has been the anterior pituitary-like gonadotropic principle, small doses (about six injections of 200 rat units) of which have been given in some cases. Thirteen patients showed a successful result by the establishment of regular menstruation immediately following operation. There were four failures. There were three patients who were treated by modern endocrine therapy, as advocated by Kaufmann, prior to operation with no result. While recognizing the inadvisability of subjecting young women suffering from developmental relative or secondary amenorrhea to laparotomy without a thorough trial of treatment along general and endocrine lines, the author believes that the operation of extroversion of the ovaries is justifiable in the following cases: 1. When endocrine therapy alone fails to restore regular menstruation or something approaching this state. 2. When a multicystic change of the ovaries can be detected clinically and the progressive nature of the lesion renders the outlook less and less favorable. 3. When time itself fails to rectify menstrual function and particularly when it becomes worse as time goes on. 4. When the nervous system shows signs of derogatory disorder in consequence of the fact of amenorrhea.

Journal of State Medicine, London

45: 497-558 (Sept.) 1937

Treatment of Tuberculosis of Lymphatic Glands. W. G. Sutcliffe.—p. 497.
Prevention of Nasal and Aural Infections in Childhood. W. Ibbotson.—p. 504.
Population Problems. E. W. C. Thomas.—p. 514.
Some Etiologic Factors in Chronic Arthritis and Allied Conditions. S. Miller.—p. 522.
Rheumatism: Trauma or Infection. D. H. Collins.—p. 529.
Some Neglected Aspects of Physical Training and Recreation. A. Mackenzie.—p. 536.
Some Problems of Smaller Authorities in Rehousing of Overcrowded Families. N. E. Chadwick.—p. 545.
Treatment of Abdominal Tuberculosis. A. Moncrieff.—p. 551.

Journal of Tropical Medicine and Hygiene, London

40: 185-196 (Aug. 16) 1937

The Rhamnose Test. A. Castellani.—p. 185.
Pâtes Médicinales and Quinquina: Treatment of K'ang Hsi, Emperor of China (1662-1723). J. W. W. Stephens.—p. 187.

40: 197-208 (Sept. 1) 1937

Biochemical Characters and Agglutinative Reactions of Metadysentery Bacilli. A. Castellani and M. Douglas.—p. 197.
Filarial Periodicity. E. H. Hinman.—p. 200.

Lancet, London

2: 421-478 (Aug. 21) 1937

*Virus in Etiology of Rheumatic Diseases. G. H. Eagles, P. R. Evans, A. G. T. Fisher and J. D. Keith.—p. 421.
Hypospadias: Its Effects, Symptoms and Treatment: Review of 101 Cases. A. R. Thompson.—p. 429.
*Sulfhemoglobinemia: Its Cause and Prevention, with Especial Reference to Treatment with Sulfanilamide. H. E. Archer and G. Discombe.—p. 432.
Fatal Hematemesis and Melena. L. D. W. Scott.—p. 435.
Theophylline-Ethylenediamine in Cheyne-Stokes Respiration. O. A. S. Marais and J. McMichael.—p. 437.
Observations on Response of Pulse Rate to Exercise in Healthy Men. A. B. Hill, H. E. Magee and E. Major.—p. 441.
Fluorescence Microscopy on Living Virus with Oblique Incident Illumination. F. Himmelweit.—p. 444.

Virus in Etiology of Rheumatic Diseases.—Eagles and his associates prepared suspensions of particles bearing a close resemblance to elementary bodies of known virus infections from a variety of materials from patients with acute rheumatic fever, rheumatoid arthritis and chorea. Nonrheumatic suspensions bear a close resemblance to those obtained from true rheumatic sources and to undisputed virus elementary bodies of comparable size. Pericardial, pleural and joint exudates contain the particles of uniform size and density to a much greater degree than other materials from acute rheumatism and rheumatoid arthritis or from nonrheumatic materials. Since these particles are not confined to rheumatic infection, agglutination tests have been used to test for their relation to rheumatism. The suspensions obtained from pleural, pericardial and joint exudates are specifically agglutinated, thus lending support to the observation that the preponderance of particles of regular size and density observed in these may be true virus bodies. In only one instance was a suspension from synovial membrane from rheumatoid arthritis specifically agglutinated. Fibrin from acute pericarditis, on the other hand, yielded suspensions that were specifically agglutinated probably by reason of the exudate present. The control suspensions, which were selected to cover a wide range, were in no case agglutinated by any of the known positive serums. When the agglutination results are studied, it is clear that not only are suitable suspensions from acute rheumatic fever, rheumatoid arthritis and chorea agglutinated by the serums of patients suffering from the particular disease from which the suspension was prepared but also considerable cross agglutination appears within the group of rheumatic diseases. From these results it would seem that these diseases are closely related. While it cannot be said that their etiology is identical, it is at least probable that they possess some common significant factor which is reflected in serologic tests. The conception of rheumatic fever and rheumatoid arthritis as closely related diseases is supported by other investigators. The common factor need not be of etiologic significance but may be some nonspecific cause such as pyrexia or an increased erythrocyte sedimentation rate. The series of cases examined is sufficiently comprehensive to show that the agglutination titer does not run parallel with either of these factors. Increased erythrocyte sedimentation is not responsible for the agglutination. Until these suspensions are proved to be infective, the possible nature of the reaction must be considered particularly in the light of certain serologic observations made in other diseases. In view of a virus hypothesis for rheumatism, the possibility of a reaction between the patient's own serum and exudates was considered, particularly in the light of the observations of Hughes (1933) on yellow fever. Dilutions of serum from a patient gravely ill with rheumatic fever in the acute stage were set up in hanging drops with his own pleural exudate after it had been centrifugated for one hour at 14,000 revolutions per minute. As a result of this centrifugation a suspension of typical rheumatic bodies had been obtained which was specifically agglutinated by the patient's own serum as well as by other acute rheumatic serums which showed at the same time definite agglutination with other acute rheumatic suspensions. The hanging drop preparations of serum dilutions and supernatant portion of the pleural exudate remained perfectly clear when examined microscopically over five successive days. No trace of precipitation was found with other known positive serums and this pleural exudate.

Cause and Prevention of Sulfhemoglobinemia.—Archer and Discombe believe that any treatment which helps the formation of a liquid stool may be expected to accelerate the formation

of sulfhemoglobinemia. The intracorpuscular sulfhemoglobinemia, associated with the administration of drugs derived from aniline, results from the combination of hemoglobin with the hydrogen sulfide absorbed from the intestinal tract; this reaction is catalyzed by the drug circulating in the blood. The normal absorption of protein digestion products in the small intestine is diminished by purgation, causing increased putrefaction in the colon and a production of hydrogen sulfide much in excess of normal. Saline cathartics are most active in this process because their osmotic action maintains the contents of the colon in a semifluid state, thus accelerating putrefaction. The development of sulfhemoglobinemia can be prevented or considerably delayed by keeping the colon free from food residues by (1) cleansing the colon with enemas before treatment is started, if purgatives have been given previously, (2) giving the patient a low residue diet, of adequate caloric value, containing few eggs, and (3) giving large, regular doses of liquid petrolatum. In treatment with sulfanilamide, it is important to examine spectroscopically the blood of all patients who develop cyanosis, for occasionally the cyanosis is due not to the presence of abnormal pigments in the blood but to the development of some other organic disease, such as pneumonia.

Medical Journal of Australia, Sydney

2: 281-330 (Aug. 21) 1937

"Q" Fever, A New Fever Entity: Clinical Features, Diagnosis and Laboratory Investigation. E. H. Derrick.—p. 281.
Experimental Studies on Virus of "Q" Fever. F. M. Burnet and Mavis Freeman.—p. 299.
Functional Pathology of Anemia. C. G. Lambie.—p. 305.

2: 331-370 (Aug. 28) 1937

Epilepsy as Symptom of Organic Lesions of the Brain. E. G. Robertson.—p. 331.
Functional Pathology of Anemia: II. Transport and Elimination of Carbon Dioxide. C. G. Lambie.—p. 341.
Dyschromia of Face: Report of Three Cases. E. Rosanove.—p. 348.
Congenital Solitary Kidney: Report of Three Cases. D. C. Trainor.—p. 352.

A New Fever Entity.—In August 1935 the occurrence of a number of cases of fever among workers in a large meatworks in Brisbane was brought to the notice of the health director, who directed Derrick to investigate the matter. It appeared that the cases which incited the inquiry had begun to occur early in 1933. The fever continued for from seven to twenty-four days. The most striking feature was the uniform failure of blood cultures and agglutination tests to throw light on the diagnosis. Typhus, undulant fever, aberrant typhoid, paratyphoid and leptospirosis have been ruled out by negative results to tests. Guinea-pigs acquired the disease readily by injection of blood or urine from a patient. Their subsequent immunity has rendered it possible to prove that this (Q fever) is a pathologic and a clinical entity. As no organism could be seen in or cultivated from human or guinea-pig material, it appeared likely that the infecting agent was a virus. Infected guinea-pig liver was sent to Burnet of Melbourne, who, transferring the infection to mice, was successful in discovering Rickettsia bodies in their spleens. Cases of fever of doubtful cause were found to occur from time to time in and around Brisbane apart from meat workers. When these were investigated, some of them proved to be due to Q fever. The nine cases described include five from the abattoir, two from other parts of Brisbane, one from Gympie and one from Pomona. In case 6 the incubation period could be deduced as fifteen days or less. The onset of the illness in all cases was acute. Within a few days of the first premonitory symptoms the victims were in bed quite ill. The first complaints were usually malaise, anorexia, headache, pains in the back and limbs and feverishness. As the illness developed, the symptoms became more severe and the general condition of the patient worse. The headache was troublesome and persistent and often interfered with sleep. The face was flushed or pale, the eyes were closed and the tongue was coated. In the more severe infections the patient became drowsy, even stuporous, and passed on into a typhoid state. The symptoms gradually abated as the temperature fell. With patients having the shorter course the improvement, once it started, was rapid. None of the cases have been fatal. The epidemiology is obscure. There is no obvious relation to the season. It is suspected that there may be a reservoir of infection in some animal with a blood-sucking parasite as a vector, but attempts to find such a reservoir have failed.

Practitioner, London

139: 213-312 (Sept.) 1937

The Psychology of Motoring. M. Culpin.—p. 213.
Vision and the Motorist. N. B. Harman.—p. 218.
Fume Poisoning and Motoring. W. Willcox.—p. 225.
Alcohol and the Motorist. A. Baldie.—p. 232.
Common Injuries and Accidents Due to Motoring. A. M. A. Moore.—p. 238.
Administration of Fluids. H. L. Marriott and A. Kekwick.—p. 250.
Orthopedic Surgery in Treatment of Rheumatism and Rheumatoid Arthritis. G. O. Tippett.—p. 271.
*Phrenic Paralysis in Treatment of Certain Thoracic Complications of Subdiaphragmatic Infection. R. Coope and H. Reid.—p. 279.
Urinary Disease Associated with Nervous Disease. A. R. Thompson.—p. 284.
Diet in Health and Disease: III. Dispensing Special Diets. Margery Abrahams.—p. 291.

Phrenic Paralysis and Thoracic Complications in Subdiaphragmatic Infection.—Coope and Reid point out that the earliest manifestation of thoracic complications of a subphrenic infection is usually a plastic pleuritis. In this way the undersurface of the lower lobe of the lung is fixed to the diaphragm. If the infection is more intense, especially if it affects a wide area under the diaphragm, there may be a rapid spread through the lymphatic glands to a considerable area of the pleura, with the development of a pleuritic effusion. An empyema may thus form and remain localized and encysted. After surgical drainage of a subphrenic abscess, fibrinous adhesions formed in the thorax may be broken down when the diaphragm descends again to its normal position. If the empyema is encysted in plastic pleuritic exudate, the infection may invade the lung and produce either pneumonitis or abscess of the lung; the pus may find its way into a bronchus, when it may be coughed up. In cases of long standing there may be actual necrosis of diaphragmatic tissue, with perforation of the diaphragm, and an hour glass type of abscess above and below the diaphragm. Effective treatment will therefore involve a careful estimate of the pathologic picture—of what has happened during the stage of active inflammation and also what is likely to happen as the result of the processes of recovery and repair. A case is reported in which the crippling effect of scarring following a subphrenic inflammation was dealt with by crushing the phrenic nerve and so paralyzing one half of the diaphragm.

South African Medical Journal, Cape Town

11: 525-556 (Aug. 14) 1937

Brocafil, a New Suture Material. P. R. Michaël.—p. 527.
Epidemiology. A. J. Orenstein.—p. 529.
Poliomyelitis: Experimental and Therapeutic Aspects. V. Brink.—p. 536.
Opportunities for Better Service. E. W. Ingle.—p. 538.

Tubercle, London

18: 529-576 (Sept.) 1937

Bovine Tuberculosis in Man. A. S. Griffith.—p. 529.
How Long Should Collapse Therapy Be Delayed? H. M. Davies.—p. 544.

Journal of Oriental Med., Dairen, S. Manchuria

27: 1-8 (July) 1937

Gastritis Due to Diphtheria Toxin. T. Yokoyama.—p. 1.
The So-Called Hairline. J. Iio, T. Ota and K. Mase.—p. 2.
Experimental Studies on Arteriosclerosis: Origin of Arteriosclerosis Through Manganese Salts. Kan-Jin-Nan.—p. 3.
The Form of the Eyelids and of the Eye Slit in the Chinese. Y. Funakawa and H. Isayama.—p. 4.
Method of Treatment of Premature Children: Action of Hormones in Premature Children. T. Iino.—p. 6.
Smallpox and Vaccination in Region of Antung in Manchuria. T. Nakashima and Y. Shikano.—p. 7.

27: 9-22 (Aug.) 1937. Partial Index

Study of Glanders: Report I: Diagnostic Value of Serum Reaction in Glanders of Humans. K. Mori.—p. 10.
Culture of Ducrey Bacillus. S. Kobayasi.—p. 11.
Pellagra in Manchuria: Three Cases. Y. Idei, T. Baden and C. Kobayasi.—p. 18.
Postparalysis After Vaccination Against Rabies: Case. Y. Idei.—p. 19.
Study of Bacterial Catalase, Especially that of Typhoid and Paratyphoid Bacillus. S. Hukuda.—p. 21.

Bull. et Mém. de la Soc. Méd. des Hôpitaux de Paris

53: 1054-1172 (July 19) 1937. Partial Index

Therapy of a Paraplegia in a Child with Syndrome of Klippel-Feil. R. Franquet.—p. 1054.
Acute Hemolytic Icterus Caused by Carcinomatosis of Bone Marrow, Secondary to Cancer of Stomach. J. Caroli and H. Lavergne.—p. 1056.
Hemorrhagic Form of Megacaryocytic Aleukemic Myelosis. Florentin, J. Girard and D. Picard.—p. 1061.
Hemorrhagic Complications of Melitococcosis. J. Olmer, M. Audier and E. Gascard.—p. 1069.
Therapeutic Intoxication by Dinitrocresol: Cataract Followed by Glaucoma; Pathogenic Considerations. Gilbert-Dreyfus and R. Onfray.—p. 1073.
Primary Porphyrinuria with Paralytic Aspects: Case. R. Boulin, R. Garcin, Nepveux and Ortolan.—p. 1079.
*Continuous Murmur of Superior Vena Cava. C. Lian.—p. 1088.
B Avitaminosis of Polynephritic Form: Case. E. Lesné, C. Launay and Rogé.—p. 1104.
*Continuous Venous Murmur of Right Interscapulovertebral Space. C. Lian.—p. 1100.

Continuous Murmur of Superior Vena Cava.—Lian states that the continuous murmurs that are perceptible at the neck have been known since the description of Laënnec; their origin in the jugular vein had been established by Hope and particularly by Aran. In this report he discusses continuous murmurs of the superior vena cava. After reporting three cases he describes the characteristics of the murmur, its etiology and mechanism and the differential diagnosis. He shows that it is a continuous murmur with systolic reinforcement, the main focus of which is located in the second and third intercostal spaces, two or three fingerbreadths away from the right side of the sternum. Its intensity is great. Its timbre is generally sharp, occasionally soft but rarely musical. The intensity and the timbre may vary in the course of the development. The author mentions five factors which he thinks prove that the curious murmur originates in the superior vena cava: (1) the continuous character analogous to the murmurs of the jugular vein, (2) the maximal localization in the region of the projection of the superior vena cava, (3) the considerable propagation in the right side of the thorax, the weak propagation in the left side of the thorax and the minimal and inconstant propagation in the neck, (4) the fact that this peculiar murmur is encountered in three cases, two of which presented signs of compression of the superior vena cava and (5) the disappearance of the murmur in a case in which the disappearance coincided with a period of amelioration of the signs of compression of the superior vena cava. Discussing the etiology and the mechanism of the murmur, the author points out that it is encountered chiefly in syphilitic patients who have an aortitis with mediastinitis or aneurysm compressing the superior vena cava. In the differential diagnosis of the continuous murmur of the superior vena cava, the author mentions the continuous murmurs due to persistence of the arterial canal, to the communication between the aorta and the superior vena cava, to propagation from the arteriovenous aneurysms of the members, to propagation of the continuous hyperthyroid murmur and to cirrhosis of Curveilhier-Baumgarten. He mentions the continuous murmur of the interscapulovertebral space, which he describes in the subsequent report.

Continuous Venous Murmurs of Right Interscapulovertebral Space.—Lian describes a continuous venous murmur of the right interscapulovertebral space in two cases. In the first case there exists a small hydatid cyst in the immediate neighborhood of the continuous murmur. It is therefore plausible to admit that the murmur is due to the compression of a branch of the posterior pulmonary vein arising from the right hilus. In the second case there exists a small abnormal shadow in contact with the origin of the right bronchus. There is justification for thinking that it results in a compression of the pulmonary vein, perhaps by a tracheobronchial adenopathy. Several intracutaneous tests with tuberculin were negative. The author concludes that these two observations together with the three observations of the preceding report about the continuous murmur of the superior vena cava show that there exist thoracic continuous venous murmurs which are distinct from the single analogous thoracic murmur already known, the continuous murmur of the persistence of the arterial canal.

Presse Médicale, Paris

45: 1355-1370 (Sept. 25) 1937

*Destruction of Pathogenic Micro-Organisms in Drinking Water by Means of Tartaric Acid With or Without Neutralization. H. Violle.—p. 1355.
*Paralysis of Dental Origin: Attempt at Explanation of Peripheral Facial Paralysis Improperly Called "A Frigore": Two Cases. P. Panneton.—p. 1356.
Epidemiologic Importance of Cutaneous Reactions with Tuberculin in Adults. R.-L. Debénédetti and E. Balgairies.—p. 1359.

Destruction of Micro-Organisms in Drinking Water by Means of Tartaric Acid.—Violle found that the bacillus of typhoid (Eberth type) is killed after a contact of from twenty to thirty minutes with a 0.35 per cent solution of tartaric acid; that the bacillus of dysentery (Shiga type) is killed after a contact of two hours with the same solution and that the bacillus of cholera (agglutinable vibrio of Koch) is killed after a contact of ten minutes with the 0.35 per cent or even a 0.25 per cent solution of tartaric acid. Thus a contact of two hours' duration with the tartaric acid solution will destroy all bacilli that are the cause of the three serious infectious diseases of the intestinal tract. It is simple to overcome the acid taste of the drinking water to which tartaric acid has been added. Neutralization is readily effected by adding approximately the same amount of sodium bicarbonate (3.5 Gm.). The author thinks that this method of treating drinking water with tartaric acid will be helpful in checking typhoid, bacterial dysentery and cholera.

Peripheral Facial Paralysis.—Panneton observed two cases of facial paralysis of the peripheral type, which developed after dental extractions. One of the extracted teeth was an upper and the other a lower premolar. The author investigated how the extraction of a tooth may lead to facial paralysis; that is, what relation exists between the facial nerve in its passage through the fallopian aqueduct and the upper and lower premolar regions of the same side. He investigated four possible connections: by contact, by vascular channels, by lymphatic channels and by nervous channels. After ruling out the connections by direct contact and by the vascular and lymphatic passages, he studied the nervous connections. He reaches the following conclusions: 1. In cases of facial paralysis of dental origin, the point of transmission is found at the level of the two superficial petrosal nerves, the large and the small, both of which enter the geniculate ganglion in contact with the facial nerve. 2. A large number and perhaps the majority of facial paralyses of the peripheral type, which are generally referred to as "a frigore," are of sympathetic origin. 3. These forms of paralysis are dependent on deep facial lesions. 4. The peripheral facial paralyses are most of the time, if not always, the result of circulatory disturbances in the vasa nervorum of the seventh cranial nerve, particularly in the region of the geniculate ganglion, and this as a result of a physiologic lesion of the cephalic sympathetic.

Progrès Médical, Paris

Sept. 25, 1937 (No. 39) Pp. 1338-1368

*Frequency of Radial Pulse Before, During and After Blood Transfusion. M. Fourestier.—p. 1345.
Critical Remarks on Hereditary Syphilis. M. Perrault.—p. 1349.

Radial Pulse in Blood Transfusion.—Fourestier points out that in a previous report (see also THE JOURNAL, September 11, p. 913), he discussed the importance of the slackening of the radial pulse during and after blood transfusions that are given in case of hemorrhages. In this paper he discusses the importance of the radial pulse in blood transfusions that are considered as true "hemotherapy"; that is, those transfusions which are given without the urgency of hemorrhage. In this type of transfusion the radial pulse must remain practically unchanged from the beginning to the end of the intervention or, after a temporary acceleration, it must revert to the initial rhythm ten minutes after the end of the transfusion. In some cases a mild slackening of the radial pulse may even be observed. This is always a favorable sign and indicates that the transfusion is well tolerated. However, if there is a permanent acceleration of the pulse, it may be caused by an imperfect technic of transfusion; or the transfusion may have been too abundant. In certain anemic patients it is necessary to avoid quantities in excess of 200 cc. In these patients it is better to repeat the transfusions than to inject one large quantity of

blood. In case a reaction of intolerance is feared, the only efficacious treatment should be resorted to, namely, the injection of morphine, which, if there is the least doubt about the patient's susceptibility for such a reaction, should be given as a prophylactic before the transfusion.

Schweizerische medizinische Wochenschrift, Basel

67: 873-892 (Sept. 11) 1937. Partial Index

Dinitrophenol Cataract in Switzerland. A. Vogt.—p. 873.
Constitution, Endocrine Constitution and Tuberculosis. O. M. Mistal. —p. 874.
*Vitamin C and Heat Regulation. F. Hasselbach.—p. 877.
Hyptiogenesis of Axis Myopia. J. Wertheimer.—p. 879.

Vitamin C and Heat Regulation.—Hasselbach shows that there are connections between increased temperatures and the consumption of vitamin C. During fever the vitamin C requirements are increased. In scurvy and in C hypovitaminosis there exists an instability in the heat regulation which can be counteracted by the administration of vitamin C. If large amounts of cevitamic acid are administered, the decline in fever is critical. In patients with pulmonary tuberculosis, the administration of vitamin C may effect an improvement of the toxic condition and with this a reduction in temperature. Moreover, clinical observations on convalescent patients seem to indicate an improvement in the vasomotor and capillary functions, two factors that are important for normal heat regulation.

Giornale di Batteriologia e Immunologia, Turin

19: 145-288 (Aug.) 1937. Partial Index

Diffusion of Tubercle Bacilli (Bovine Strain) from Inflammatory Foci of Various Natures. L. Michelazzi.—p. 145.
Subungual Contents of Patients Suffering from Pulmonary Tuberculosis in Sanatoriums in Relation to Diffusion of Tubercle Bacilli. L. Trossarelli.—p. 156.
*"Vi" Antigen of Eberthella Typhi. U. di Aichelburg and L. Montagnini. p. 190.
Antigen Properties of TAB and TABCh Multiple Formolated Vaccines. E. Satta.—p. 209.
Vi Antigen of Typhoid Bacilli. E. Satta.—p. 227.

Virulent Antigen of Eberthella Typhi.—Aichelburg and Montagnini studied thirty-five strains of Eberthella typhi isolated from the feces or the blood of patients suffering from typhoid. The group included recently isolated and old strains. Researches were also made on twenty-eight specimens of blood serum of the patients. Thirty-four strains, in the group of thirty-five, contained the Felix-Pitt "Vi" (virulent) antigen. Thirty strains were agglutinated by blood serum which contained the specific O antibody. Twenty-nine strains of this group and four of the five which were not agglutinated by the O antibody were agglutinated by blood serum containing the Vi antibody. In the majority of the blood serums the agglutinating titer of Vi and O antibodies was high. Intraperitoneal inoculation of suspensions containing any of the twenty-nine Vi strains to guinea-pigs killed the animals. In twenty-five out of a group of twenty-eight specimens of blood serum of patients suffering from typhoid or of convalescents the content of Vi antibodies was low. A relation between the presence and amount of Vi antibodies in the blood serum of the patients and the clinical evolution of the disease cannot be established. The antigen-antibody reaction between strains of Eberthella typhi and the O antibody takes place but is invisible. It is possible to have agglutination, however, by using a large amount of O antibody. The variations S-R (smooth-rough) of typhoid bacilli induce no changes in the agglutinability of the bacilli by Vi antibodies. The Vi antigen lasts for years in the strains of Eberthella typhi which are preserved on common cultural mediums. The strains of Eberthella typhi which contain Vi antigen are extremely sensitive to the action of antityphoid bacteriophage. The authors say that some of their results conflict with those reported in the literature, especially by Felix, Pitt and Kauffmann. According to the authors there is no relation between the presence of Vi antigen in Eberthella typhi and the lack of agglutination of the organism by O specific antibodies. The existence of reversible gradual transformations of Eberthella typhi into strains having and losing, respectively, Vi antigen and agglutinating properties for O antibody has not been proved. Old age has no influence on the agglutinating properties of Vi antigen, provided Eberthella typhi is preserved in simple cultural mediums. Most of the strains that contain Vi antigen are virulent to white rats. Their virulence to man has not as yet been established. Vi antigen does not prevent binding between O antigen and O antibody. The authors conclude that the chapter of serology of Eberthella typhi is waiting for researches, especially because of the importance of Vi antigen in immunization against typhoid.

Minerva Medica, Turin

2: 265-288 (Sept. 16) 1937

Bacteriologic Individuality of Enterococcus and Its Importance in Human Pathology. L. D'Antona.—p. 265.
Thromboleukopenic Hemorrhagic Diathesis in Adult: Effects of Splenectomy. M. Bassi.—p. 270.
*Sedimentation Speed of Erythrocytes in Intestinal Amebiasis. A. M. Cicchitto and E. Cicchitto.—p. 274.

Sedimentation Speed of Erythrocytes in Amebiasis.—According to the Cicchittos, in intestinal amebiasis in tropical countries the sedimentation speed of the erythrocytes is slightly increased. There is a parallelism between the behavior of the sedimentation speed and the clinical symptoms. The most rapid sedimentation speed is in the blood of patients suffering from enlargement of the liver and liver disorders. The changes of the sedimentation speed of erythrocytes are due to disturbances of the metabolism of water and sodium chloride, which are induced by diarrhea, to changes in the metabolism of calcium and to alterations in the crasis of the blood. Intestinal toxemia, displacement of labile proteins of the blood and the dysfunction of the liver and of the reticulo-endothelial system are also increasing factors of importance. Administration of a specific treatment improves the crasis of the blood and the general condition of the patient and simultaneously brings the sedimentation speed to normal. The sedimentation speed in intestinal amebiasis has no diagnostic value. It has a prognostic value, as it shows the evolution of the condition. By evaluating the behavior of the velocity of sedimentation during administration of treatment, one is able to determine the intensity and duration of the treatment needed.

Policlinico, Rome

44: 437-500 (Sept. 15) 1937. Surgical Section

*Motor Functions of Stomach After Resection. G. Barbèra.—p. 437.
Posttraumatic Ossification of Periarticular Tissues. E. Caldarera.—p. 452.
Posttraumatic Subdural Hematoma. S. Ciancarelli.—p. 460.
Functional and Morphologic Surgical Restoration of Stomach and Colon in Ptosis and Ectasia. B. Schiassi.—p. 483.

Motor Functions of Stomach After Resection.—Barbèra studied the motor functions of the remaining portion of the resected stomach by means of (1) roentgen examination of the gastric stump after administration of small and large amounts of an opaque substance, (2) serial roentgenograms of the folds of the gastric mucosa and (3) kymography of peristalsis of the gastric stump and the anastomosed loop. His group included about 500 patients. The author concludes that the remaining portion of the stomach and the anastomosed loop regain, shortly after resection, motor conditions close to normal. Tonicity, the movement of the folds of the gastric mucosa and peristalsis are the main factors in controlling the emptying of the stomach. Tonus is regained by the stump shortly after resection. The folds of the gastric mucosa converge toward the anastomotic mouth at which a new sphincter is almost formed and show opposing movements in the folds and in the anastomotic mouth. Peristalsis is less energetic than that of the normal stomach. It is uncoordinated, owing to the removal of the pyloric portion during gastric resection. However, it has a sufficient action on the emptying of the stomach. The type of resection and the greater or lesser amplitude of the new mouth are factors of minor importance with regard to the motor functions of the stomach after resection.

Rivista di Clinica Medica, Florence

38: 267-324 (July 15-30) 1937

*Splenopathies in Association with Gastroduodenal Diseases. M. Volterra. —p. 267.
Intravenous Vaccine Therapy of Brucellosis. C. Pegoraro.—p. 290.

Splenomegaly and Gastroduodenal Diseases.—Volterra reports seven cases of chronic splenomegaly of the congestive, fibrous or thrombophlebitic type which was associated with gastroduodenal diseases. According to the author, the condition is more frequent in men than in women. The enlargement of the spleen follows a chronic course before the gastroduodenal symptoms appear. Frequently a transient attack of malaria

takes place early in the course of the disease of the spleen. The clinical and roentgenologic aspects of the gastroduodenal symptoms are varied, showing ulcer, duodenitis, pseudoduodenitis, erosions of the gastric and duodenal mucosae or simple congestion of the gastroduodenal mucosa with a tendency to grave hematemesis and intestinal hemorrhage. The tendency to hemorrhages appears late in the evolution of the disease of the spleen. According to the author, disturbances of the abdominal, especially the portal, circulation are the cause of the disease of the spleen with consequent alterations of the gastroduodenal mucosa, which may vary from simple congestion and erosion of the mucosas to formation of ulcer.

Klinische Wochenschrift, Berlin

16: 1201-1232 (Aug. 28) 1937. Partial Index

Studies on Modification of Carbohydrate Metabolism by Arsenic. H.-A. Oelkers.—p. 1204.
Gastric Ulcers Caused by Deficiency in Vitamin C: Experimental Production and Pathogenesis. H. Hanke.—p. 1205.
Aspects of Cerebrospinal Fluid in Funicular Spinal Disease. H. U. Guizetti and R. Prõtt.—p. 1206.
Technic of Photography of Oral Cavity. R. Du Mesnil de Rochemont.—p. 1207.
*Observations on Poliomyelitis in Years from 1931 to 1936. A. Stender.—p. 1209.
New Simple Colorimetric Procedure for Examination of Function of Sweat Glands. L. Guttmann.—p. 1212.

Observations on Poliomyelitis.—According to Stender, it is well known that epidemics change in the course of centuries or even of decades. This is especially true of poliomyelitis, which occurred only sporadically until the beginning of this century but has appeared more frequently in epidemics in the temperate zones during the last four or five decades. In the author's province (Silesia) epidemics were observed in 1932, 1935 and 1936. Diagrams indicating the number of cases and their distribution in the different months of the years from 1931 to 1936 inclusive reveal that epidemics are usually preceded by a series of sporadic cases. Although the epidemics usually cease with the onset of cold weather, they may extend beyond the so-called typical months into the winter months. The initial symptoms are frequently like those of influenza, but within a few hours, or one or two days, they are followed by the symptoms of the preparalytic stage, which has been designed as the meningeal period because the symptoms are those of a histologically proved infiltration of the meninges, particularly the pia mater. In the fifty-one cases of poliomyelitis observed by the author, the following preparalytic symptoms were observed: rigidity and pain of the neck (eleven times), pain in the back and lumbago (seven times), pains in the joints (nine times), hypersensitivity to tactile irritation of the skin (twice), profuse sweating (six times), disturbances of the bladder (four times), paresthesias in fingers and toes (once), gastric and intestinal disorders (eight times), abdominal pains (seven times), pharyngitis (nine times). Whereas some of these symptoms are characteristic for poliomyelitis, others might suggest other infections and so it may be impossible to make the definite diagnosis of poliomyelitis on the basis of the preparalytic symptoms. However, if poliomyelitis is suspected, a lumbar puncture should be made for the purpose of examining the cerebrospinal fluid, for pleocytosis may exist, during the preparalytic stage. To be sure, leukocytosis of the spinal fluid is found also during the incipient stage of epidemic meningitis, which, however, occurs chiefly during the spring and disappears with the onset of warm weather. Other forms of meningitis are usually readily differentiable from the preparalytic stage of poliomyelitis, because the protein values are generally greatly increased, which is not the case in poliomyelitis. The paralysis does not always spread to adjoining muscle groups but may first attack a leg, then an arm, then the musculature of the trunk and after that the other extremities. In view of this mode of spreading it has been suggested that from the blood or lymph channels the virus reaches the spinal cord successively at various sites. The ascending type of paralysis was observed twice by the author and in both cases death was caused by respiratory paralysis. Convalescent serum should be administered during the preparalytic stage and even during the paralytic stage. The author injects the serum both into the lumbar portion of the spinal cord and into the muscle and obtained favorable results.

Medizinische Klinik, Berlin

33: 1253-1284 (Sept. 17) 1937. Partial Index

Inflammation of Uterine Tubes as Cause of Sterility: Therapy and Prophylaxis. F. von Mikulicz-Radecki.—p. 1253.
Nervous Disturbances in Exophthalmic Goiter. F. G. von Stockert.—p. 1256.
*Appearance and Disappearance of Gunn's Jaw Lid Phenomenon (Jaw Winking) During Regression of a Syphilitic Ptosis. K. Ascher.—p. 1259.
Rôle of Duodenal Diverticulum in Roentgenologic Diagnosis. H. Brodersen.—p. 1266.
Results of Dietetic Treatment of Peptic Ulcer. L. Falkensammer.—p. 1267.
*Simple Reaction for Demostration of Bilirubin in Urine. B. von Purjesz.—p. 1271.

The Jaw Winking Phenomenon.—Ascher says that Gunn in 1883 gave the first description of the jaw winking phenomenon, and about 100 cases have since been reported. His case reported here presents some unusual aspects and throws light on the origin of the phenomenon. A man, aged 44, had syphilis, complete oculomotor paralysis on the right side, loss of the pupillary reflexes on both sides and bilateral paralysis of the accommodation. The patient was subjected to intensive treatment with bismuth compounds and neoarsphenamine and to malarial therapy. After the completion of these treatments the patient observed one day that when he opened the mouth and chewed, the formerly entirely immobile upper lid jerked upward. After about a week this phenomenon ceased and the upper lid could be moved voluntarily. Meanwhile the other signs of paralysis persisted. The author points out that the majority of cases of jaw winking (jaw lid phenomenon) are associated with congenital ptosis. The intravital development of the jaw lid phenomenon is rare, but what is even more unusual is the fact that it appeared and disappeared in a short time, a peculiarity which never before has been reported. The author points out that the temporary character of the phenomenon contradicts the theory that it is the result of abnormal connections between the nuclei in which originate the involved nerve fibers. The author is inclined to accept as an explanation the existence of innervation complexes which are atavistic and dormant under normal conditions but which become active in case of disturbances in the oculomotor region. He calls attention to other manifestations that suggest a connection between the lifting of the lids and the opening of the mouth (opening of the eyes during eating and opening of the mouth while looking sharply).

Simple Demonstration of Bilirubin.—It is pointed out by von Purjesz that the demonstration of bilirubin in the urine is based on the oxidation of bilirubin to biliverdin. The reaction suggested by him is based on this oxidation. From 2 to 3 cc. of urine is placed in a test tube and is mixed with 2 cc. of a 20 per cent solution of sulfosalicylic acid. Then from two to five drops of a 30 per cent solution of hydrogen peroxide is added. After shaking, the mixture is left standing; the green coloration appears after a few minutes or, at the latest, after fifteen minutes. The intensity of the green depends on the quantity of the bilirubin; if the bilirubin content is slight, there appears an olive green instead of a grassy green. If the urine is free from bilirubin, a reddish color develops. The presence of considerable quantities of blood impairs the reactions, but this shortcoming can be overcome by filtration. Moreover, it is possible to use other types of acid, but the author suggested sulfosalicylic acid because it is available in the smallest laboratory. He stresses that the method is simple, reliable and sensitive and can therefore be used by the general practitioner.

Münchener medizinische Wochenschrift, Munich

84: 1441-1480 (Sept. 10) 1937. Partial Index

*Toxic Effects of Arsenic Treatment. Siemens and Simons.—p. 1444.
Newer Results in Sphere of Bechterew's Disease. L. Grabowski.—p. 1446.
*Unusual Form of Vascular Impairment in Scarlet Fever. H. Zischinsky.—p. 1448.
Question of Treatment of Dazed Condition in Epilepsy. F. Baldauf.—p. 1456.
Residual Conditions After Cholecystectomy and Their Treatment with Hormone of Wall of Gallbladder. R. Bimler.—p. 1458.

Toxic Effects of Arsenic Treatment.—Siemens and Simons point out that there are widely differing opinions about the toxic effects of the doses of arsenic applied in dermatologic disorders. Moreover, the estimation of the incidence of toxic

complications is difficult, because there is no uniformity in the dosage. The authors describe observations in 137 cases of psoriasis in which arsenic treatment according to Gebert was employed for periods of from two to six months. The Gebert treatment was given in the strong dose (fifty-seven cases) or in the weak dose (eighty cases). Gebert's treatment consists in the administration of arsenic in the form of pills (Asiatic pills) and of drops. In the strong treatment pills of 0.005 Gm. are given, in the weak treatment pills of 0.001 Gm. All the patients treated by the authors showed toxic manifestations. The maximal dose could be reached only in some of the patients and only a few could support the maximal dose for longer periods. Habituation to arsenic was obtained in a few cases; in others, hypersensitivity developed instead. Abrupt cessation of the arsenic medication never resulted in undesirable manifestations, and it is therefore unnecessary to decrease the number of drops gradually. Since pepper, which is generally added to the Asiatic pills, may cause undesirable complications, it should be omitted. The authors observed also that arsenic treatment does not, as is often stated, result in an increase in weight, but rather in a decrease. Their patients had an average loss of weight of 5 Kg. Cutaneous manifestations were frequently observed in the course of the treatment with arsenic. More than a third of the patients developed melanoses. These signs of intoxication were surprisingly more frequent in the weaker form of arsenotherapy than in the stronger form. Arsenical zoster was observed in thirteen cases of the group in which the weak treatment was administered and in only one of the patients receiving the stronger doses. The zoster disappears again, even if the arsenotherapy is continued; consequently it is no contraindication to the continuation of the treatment.

Unusual Form of Vascular Impairment in Scarlet Fever.—Zischinsky recently reported three cases of nonnephritic edema after scarlet fever. In one of the patients, cutaneous hemorrhages developed and, on the basis of this case, the disorder was considered to be a form of vascular impairment. The present report about this relatively rare complication of scarlet fever was occasioned by the observation of another case and by the fact that the author's attention had been called to earlier reports on this condition. It had been pointed out to him that Quincke as early as 1882 described simple dropsy in scarlet fever and in 1906 the same author described observations on toxic dropsy in scarlet fever. Zischinsky thinks that his observations and those reported by Quincke are identical, although Quincke fails to mention cutaneous hemorrhages. After reviewing other reports from the earlier literature of dropsy after scarlet fever, the author suggests that the absence of reports about this form of vascular changes from the recent literature does not mean that such cases did not occur but rather that they were overlooked or incorrectly interpreted.

Wiener medizinische Wochenschrift, Vienna

87: 979-1014 (Sept. 25) 1937. Partial Index

Sport and Danger. B. Breitner.—p. 982.
Pathology of Cancer. A. Fraenkel.—p. 986.
Vitamin Problems During Childhood. B. Leichtentritt.—p. 991.
*Vitamins in Auxiliary Treatment of Chronic Articular Diseases. E. Maliwa.—p. 996.

Vitamins in Chronic Articular Disorders.—Maliwa takes up cases of chronic arthritis in which roentgenoscopy discloses a diffuse deficiency in calcium with relatively slight changes in the joints. This calcium deficiency is not manifested by the lacunar outlines characteristic for acute atrophy of the bones, its x-ray appearance being that of the atrophy of inactivity. Clinical examination reveals a diffuse sensitivity to pressure in the involved bone. In such cases medication with vitamin D is a valuable therapeutic adjuvant, in addition to the usual measures. The author recommends the administration of vitamin D in the form of drops, given two or three times daily, for a period of six weeks. After an interval of four weeks, the same medication may be repeated. The second group of cases discussed by the author are those of typical infectious arthritis. He shows that in this disorder medication with vitamin C is helpful. He provides vitamin C in the form of tablets and in the diet. If calcium deficiency develops in cases of chronic infectious arthritis, the combined administration of vitamin C and D is advisable. The third group of cases are those in which arthritic and neuritic symptoms concur. In some of these the symptoms of the joints are comparatively slight but the pains are usually severe. In such cases the administration of vitamin B_1 is helpful.

Nederlandsch Tijdschrift v. Geneeskunde, Amsterdam

81: 4427-4542 (Sept. 18) 1937

Kyphoscoliosis with Neurologic Manifestations. W. G. Sillevis Smitt.—p. 4428.
Protrusion of Intervertebral Disk into Spinal Canal with Symptoms of Pressure on Spinal Cord and Roots. C. H. Lenshoek.—p. 4435.
*Food Poisoning by Staphylococci. W. A. Timmerman.—p. 4443.
*Meningism in Leukemia and in Weil's Disease. J. E. Minkenhof.—p. 4448.
Treatment of Addiction to Alcohol. A. M. Meerloo.—p. 4456.

Food Poisoning by Staphylococci.—Timmerman describes several cases of food poisoning that developed after the eating of liver sausage. Examination of the sausage revealed the presence of staphylococci, which proved capable of forming enterotoxins. Since experiments on animals are not conclusive in determining that food poisoning is caused by staphylococci, a test was made on a person who volunteered. The person developed symptoms of acute food poisoning. The author thinks that a larger number of cases of food poisoning are caused by staphylococci than is generally believed and that poisonings that develop after the eating of cheese are often caused by staphylococci. To be sure, poisoning by cheese has been ascribed to Bacillus coli, but studies of many samples of cheese revealed that Bacillus coli was present in almost 60 per cent of the samples, but none of these samples produced poisoning when consumed. Thus the causal significance of Bacillus coli for cheese poisoning seems to be disproved.

Meningism in Leukemia and in Weil's Disease.—Minkenhof reports several cases that presented symptoms of severe meningism. The first patient had a subacute lymphatic leukemia which presented the aspects of a meningococcic sepsis with meningitis. The author points out that neurologic changes are occasionally observed in patients with leukemia and he reviews the literature on neurologic changes in leukemias. The other patients had Weil's disease. In these patients the only symptoms were pyrexia and meningeal irritation. The author shows that in patients with Weil's disease there is no direct relationship between the degree of meningism, the composition of the cerebrospinal fluid and the possible occurrence of Leptospira in the arachnoidal space. Several other authors have made the same observation; namely, that in all forms of Weil's disease the spinal fluid may be normal as well as abnormal. Apparently it is often possible to detect Leptospira in the spinal fluid during the first week of Weil's disease. The author emphasizes that in all cases of meningism and serous meningitis in which the cause is obscure the possibility of infection with Leptospira should be taken into consideration.

Ugeskrift for Læger, Copenhagen

99: 863-878 (Aug. 19) 1937

*Effect of Inorganic Iodine Combinations and of Diiodotyrosine (3.5 diiodo-4-Oxyphenylalanine) on Simple Hyperthyroidism and on Experimental Exophthalmic Goiter. M. Krogh and H. Okkels.—p. 863.
Studies on Etiology of Infectious Mononucleosis. A. Nyfeldt.—p. 866.
Microspinal Anesthesia, Especially in Cystoscopy. P. Fjeldborg.—p. 872.

Hyperthyroidism and Exophthalmic Goiter.—Krogh and Okkels state that the metabolism and histologic examinations show that simple hyperthyroidism in guinea-pigs (hyperthyroidism induced by administration of thyroid preparations) is not affected by iodine either in inorganic preparations or in the form of 3.5 diiodo-4-oxyphenylalanine. Experimental exophthalmic goiter (hyperthyroidism caused by injection of a preparation of the thyroid-stimulating hormone) is acted on by iodine, both in inorganic combinations and in the form of 3.5 diiodo-4-oxyphenylalanine, and when the doses are equal, more rapidly by potassium iodide and slowly by 3.5 diiodo-4-oxyphenylalanine. The administration of iodine alone, like the administration of thyroxine, to some degree reduces the function of the thyroid; iodine cannot further reduce the function of a gland acted on by thyroxine.